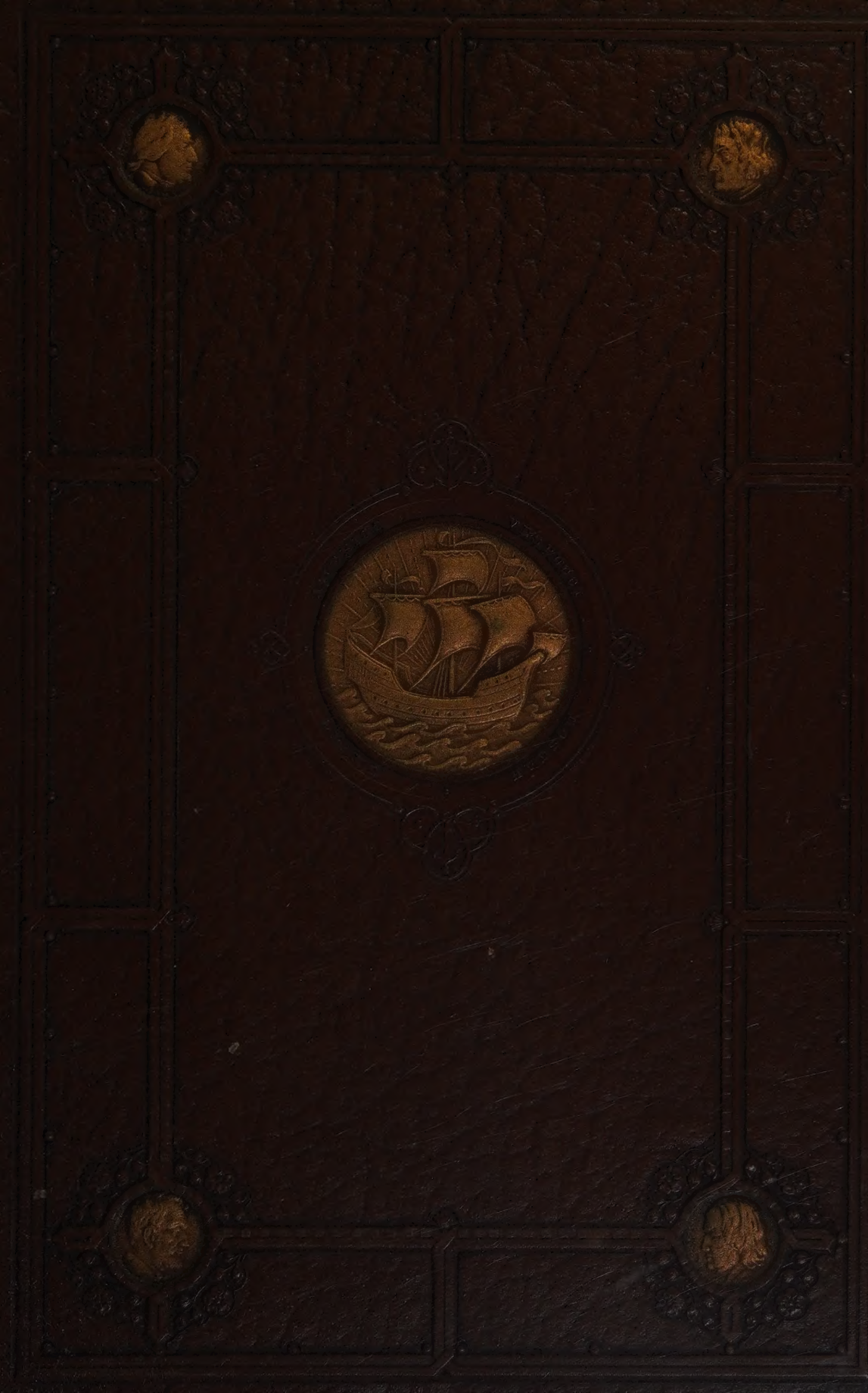




H. A. BARRINGTON

SANTA CRUZ, CAL.

The BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth	The United States
Stories and Legends	Familiar Things
All Countries	Our Own Life
Golden Deeds	The Fine Arts
Helps to Learning	Men and Women
Literature	Poetry and Rhymes
Animal Life	Plant Life
Famous Books	Things to Make
Dominion of Canada	and Things to Do
Book of Wonder	

VOLUME XII

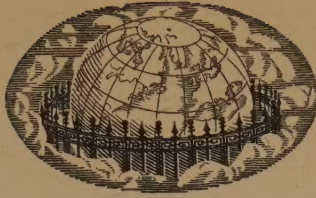
New York

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CONTENTS OF THIS VOLUME

This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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Photo, courtesy Canadian National Railways.

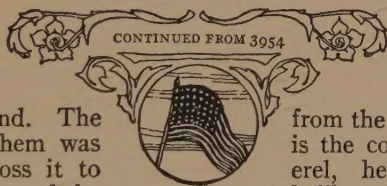
Old Orchard Beach, on the coast near Portland, Maine.

THE NORTHEASTERN STATES

PART III

AS we have seen, the sea served the earliest settlers twice, and twice they left the sea behind. The first time it served them was when they sailed across it to make their homes here, and the second when they turned to the sea for trade and privateering. They left it for manufacturing, but as the years went by people have realized the advantages of the sea, and the Northeast has turned back to it again. These advantages are mainly three in number. The sea is a source of food and raw material, it is a medium of travel, and it is a source of pleasure and comfort.

As a source of food and raw materials the sea is of increasing value. If the land cannot in the future supply us with all of our food, as some say, then the large sources of sea food which are as yet undeveloped must be called upon as an additional supply. To-day there is still some difficulty in marketing fish because of the uncertainty of the markets. Gloucester, Massachusetts, is perhaps the best-known fishing town, and has developed extensive industries in preparing fish for distant markets. Boston, however, is a larger fishing centre than Gloucester, and



much of the fresh fish distributed throughout the Northeast comes from the Boston markets. Cod is the common fish, but mackerel, herring, swordfish and halibut are widely distributed.

In the shallower waters along the shore, lobsters, clams and oysters abound. The Long Island Sound, Cape Cod, Delaware Bay and Chesapeake Bay oysters are well known.

In the second place, the sea as a medium of travel is now made use of as never before, and consequently the Atlantic seaboard has a position of supreme importance. Ships leave its ports for all parts of the world.

Four ports—New York, Philadelphia, Boston and Baltimore—handle nearly half the tonnage of the foreign commerce of the United States, while New York alone handles a little more than half of the \$8,000,000,000 in value of the foreign trade of the United States. New York has the advantage of being the natural gateway from the west. The mountain ranges which parallel the Atlantic coast are cut across in New York State by the broad valley of the Mohawk, which extends practically from Buffalo to Albany. The valley is densely populated, containing such

cities as Rochester, Syracuse, Utica and Schenectady, as well as many smaller centres. Through this valley run the main railroad lines to the interior and the West, and the New York State Barge Canal (Erie Canal) connecting Lake Erie at Buffalo with the Hudson River. At Albany the narrow valley of the Hudson River continues the thoroughfare to New York City. New York harbor is the terminus of over two hundred steamship lines, and it is said that an ocean liner passes in or out of the harbor on an average of every ten minutes throughout the day. The goods brought in are distributed by means of twelve railroad lines and a number of coastwise steamers.

Boston has the advantage of being nearer Europe than New York, but from the standpoint of the large part of this country the port is somewhat isolated. From Albany the railroad must climb over a thousand feet to surmount the Berkshire Hills, while it is down grade to New York.

Philadelphia and Baltimore lie far inland, the former 110 miles from the sea and the latter about 200 miles. They are in a densely settled area and are not so shut in as Boston. The Coastal Plain and the Piedmont Belt, which parallel the Atlantic coast, both produce and consume great quantities of goods. As far as the West is concerned, they have little advantage over Boston, since the Pennsylvania Railroad from Philadelphia and the Baltimore & Ohio Railroad from Baltimore must ascend well over two thousand feet in order to cross the Appalachian Highlands and penetrate the interior. In its contact with the West, New York stands alone, superior to all other ports.

THE GREAT MACHINERY REQUIRED BY A MODERN PORT

Ports to-day are very complicated affairs. A statement is made that "a great ocean freighter was recently loaded in New York harbor with a cargo destined for a distant South American port, when, just before the sailing hour, it was found advisable to withdraw the steamer. It was, however, discovered that the cost of unloading the cargo and transferring it a distance of sixty feet on the dock would equal the entire expense of carrying it five thousand miles or more to South America." The problem of loading and unloading is expensive, as you see. Wages of a large number of people must be paid while the vessel is in port, and

any delay means a heavy loss. Consequently the ports must have intricate machines, electric trucks and not hand-trucks, great power derricks, and every facility for speeding up the work. All these are found at modern docks to-day.

Remember that a vessel may be 900 feet long over all and that six of these mean a mile of docking space; and also that there might be two hundred ocean vessels in the harbor of New York at one time, since two hundred steamship lines have that port for a terminus. About thirty-five miles of dockage space would then be required. Add to this the large number of ferry boats that ply between Manhattan Island and Brooklyn, Jersey City and the adjacent shores, the Hudson River steamers, and the coastwise steamers, and it can be seen that dockage for all these boats is a serious problem. This is partly solved by having long piers and docking the vessel at right angles to the shore rather than parallel. Even with this device the larger Atlantic ports are finding docking problems very burdensome.

THE SHORE AND MOUNTAIN RESORTS OF THE SECTION

The third value of the sea is the use of it as a pleasure-ground. The Atlantic shore is almost a continuous summer colony from Eastport, Maine, southward. The best-known of the resorts are Newport, Rhode Island, and Atlantic City, New Jersey. Newport is the summer home of very wealthy people. The cottages can hardly be considered cottages in the ordinary sense, since they range in cost from \$200,000 to \$2,000,000. Atlantic City is open the year round and caters to all classes of people. It is, unlike Newport, predominantly a resort of hotels and boarding-houses. Thousands of people visit here during the year, and the famous boardwalk at the height of the season, on Easter Sunday, is possibly more crowded than any other street in the country. In addition, famous but less well-known resorts are found at Bar Harbor and Old Orchard Beach, Maine, on Cape Cod, Massachusetts, at Narragansett Pier and Watch Hill, Rhode Island, at Rockaway Beach and Coney Island, New York, and at Asbury Park and Ocean Grove, New Jersey.

WHY PEOPLE SEEK THE SHORES OF THE OCEAN

The advantage of the shore in summer arises from the lower average temper-

SCENES ALONG THE WATERFRONT



The East River, between Manhattan Island and Brooklyn, is always crowded with shipping from every part of the world. Three of the great bridges across the river can be seen in the background.



This is T Wharf in Boston with fishing schooners unloading their cargoes.



A bit of Old Gloucester, Massachusetts, showing nets drying on the wharf.



These bales of rattan from Malaysia have been unloaded at the Bush Terminal in Brooklyn. They will soon go to the manufacturers of furniture. These trucks are attached to a tractor.

Photo of Boston by George Brayton; others from Ewing Galloway.

ature which prevails, first, because the larger amount of water-vapor in the air does not allow the sun's rays to penetrate so easily; second, because the evaporation tends to lower the temperature; and, third, because the water surface will not get so warm as the land surface when the sun is shining. Thus a breeze from the water will in summer be some degrees lower than a breeze from the land. The main attraction, however, is the bathing, and the bathing-beaches are crowded during the warm days of summer. Along the Maine coast rocky headlands and islands are common. These are remnants of the land left by the eroding glacier which wore away the softer areas to form to-day great bays and channels. Few beaches are found along the Maine coast, and because the water is deep in the fiord-like channels and the tides turn it over constantly, the temperature of the water is much colder than where shallower water and sandy beaches prevail. Southward from Maine, beaches increase in number, until from New Jersey southward there is almost a continuous beach facing the Atlantic Ocean.

In addition to the great playgrounds found along the coast, the mountains offer a different kind of resort for those who prefer them. Here drier conditions exist, the altitude and the open vegetation-covered spaces tend to give much lower temperatures than the cities experience, and the variety and grandeur of the scenery are attractive.

Most famous of the mountain resorts are the Adirondack Mountains. These have a combination of mountain and lakes, with much wooded area, which give a dry, cool and invigorating atmosphere. It has been known as a health-resort, hunting-ground and pleasure area for years. To the south of the Adirondacks are the Catskill Mountains (really a plateau), which teem in summer with the New York City lovers of open spaces; farther south, in Pennsylvania, are the Appalachian Highlands, culminating in the famous resorts of the Pocono Hills. To the north the Berkshire Hills in western Massachusetts, the Green Mountains of Vermont, and the White Mountains of New Hampshire offer excellent summer sport. Mount Washington, 6,279 feet, is the highest peak in the Northeast.

In addition, the area is a lake country,

and along the shores of large and small lakes, hotels, summer settlements and camps offer fresh-water bathing, fishing and sports, to the advantages of the inland spaces. Most beautiful of them all is Lake George, in New York near the Vermont border; and the largest of them lies to the north—Lake Champlain.

Maintaining resorts is a business, and should be counted as one of the great industries of the Northeast. It is apparently the chief business of New Hampshire in amount of money involved; it is certainly the second in Rhode Island, and it would count high in all the Northeastern states. The Boston Chamber of Commerce estimates that the net gain to New England on account of her resorts amounts to about \$100,000,000 annually.

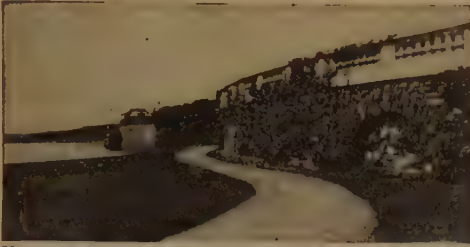
THE DIFFERENT PHYSICAL REGIONS OF THE NORTHEAST

It is convenient when studying a country to divide it into regions of like surface features rather than to study the area on the basis of political units such as the state or nation. The Northeastern section has a number of such physical regions. The characteristics of these have been mentioned at various places in the text: (1) The Coastal Plain extends southward from New York City and lies between the Shore and the Fall Line. (2) The Piedmont Belt extends throughout the length of the Northeast from Maine southward. In New England the eastern boundary is the Shore Line, farther south it is the Fall Line, and the western boundary the mountains. (3) The Appalachian Ridges and Valleys (Great Appalachian Valley) are a belt running parallel to the former and lying adjacent to it on the west. (4) The Appalachian Plateaus include the Allegheny and Catskill plateau section. (5) The Mohawk Valley. (6) The Adirondacks in northern New York.

SOME THINGS ABOUT THE CLIMATE OF THE NORTHEAST

The climate of the section shows great extremes. The winters are cold and the summers warm. However, it is not the coldest nor the warmest belt in the United States. The summer heat is moderated by altitudes in the interior and by the nearness to the sea; and most towns and cities have near at hand some refuge from the heat of closely built places, either shore resort or lake. The sea also moderates the winter cold, but its influence lessens rapidly as one leaves the shore.

REST AND PLEASURE BY THE SEA



Newport, Rhode Island, is perhaps the most fashionable of American seaside resorts, and many imposing mansions have been erected. To the left is the Cliff Walk, and Bellevue Avenue is on the right.



The broad Boardwalk at Atlantic City, New Jersey, is famous the world over. In summer and on holidays thousands of visitors crowd it. The land side is lined with shops and great hotels.



Many "cottages" at Newport are really great houses. Into them and their surroundings has gone some of the best work of famous architects and landscape-gardeners. Newport was long one of the state capitals. Upper pictures, courtesy Newport Chamber of Commerce; Atlantic City, copyright, Atlantic Foto Service; bottom picture, John Rugen.

Snow covers all the area during the winter. In the north the snow stays on the ground continuously, sometimes for five months, but along the coast and in the south the "open" winter frequently prevails. Snow falls early in the north—during 1925 roads in New England hills and mountains were deep in snow on October 10—and remains late. Frequently in the spring when the snow melts, heavy floods do much damage.

Temperatures are frequently and best recorded by the length of the growing season, that is, the number of days between the last killing frost in spring and the first in the fall. In Maryland and Delaware this is about 200 days; in New Jersey and southern New England, 190 days; central Pennsylvania, 140 days; northern Maine, 120 days; while around Lake Ontario it rises to 170 days. Thus the southern part of the area has nearly three months longer growing season than the extreme northern. This is shown in the Boston market by the vegetables and fruits which appear from Maryland, Delaware and New Jersey before the New England crop is ready.

The rainfall varies, but in general it may be said to average about 45 inches per year, and it is distributed almost evenly through the months.

The area has long capitalized its summer resorts, and now there is a growing tendency to do a similar thing during the winter season. Many hotels in the mountains are opening for a brief period during the winter and advertising winter sports. The winter at Dartmouth College, Hanover, New Hampshire, once a dreary season, is now anticipated more than any other season of the year. Snowshoeing, skating, skiing and tobogganing are beginning to appeal to the strong as more pleasurable than bathing in Florida.

Now, having spoken of the agriculture, the forestry, the mining, the manufacturing, the commerce and the climate of the section, what can we say of the people?

WHO ARE THE PEOPLE OF THE NORTHEASTERN STATES?

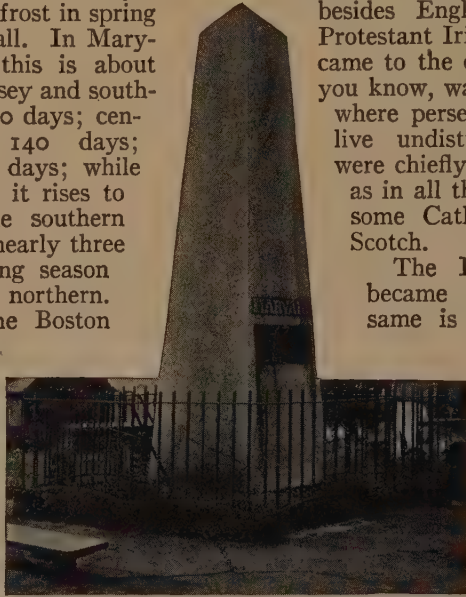
The first settlers of New England were chiefly English. New York, though settled first by the Dutch, soon received settlers from nearly every country of Europe, and at the time of the Revolution many languages were spoken in the colony; New Jersey and Delaware were also claimed by the Dutch, though Swedish settlements had been made on the Delaware. All these soon came under English rule. The founders of Pennsylvania were liberal from the first, and besides Englishmen thousands of Protestant Irish, German and Swiss came to the colony. Maryland, as you know, was founded as a refuge where persecuted Catholics might live undisturbed. The settlers were chiefly English, though here, as in all the colonies, there were some Catholic Irish and some Scotch.

The Dutch language soon became uncommon, and the same is true of the Swedish, but down to the present day good German may be heard in many Pennsylvania communities, but a mixture of German and English called "Pennsylvania Dutch" is more common in those counties where the Germans chiefly settled.

We have already told you of the way in which the New Englander moved westward. The inhabitants of the other states also moved, but Pennsylvania and New York were larger and the soil was richer. Many therefore simply moved westward within the states up to the Revolution. Later these states furnished many settlers to the Mississippi Valley.

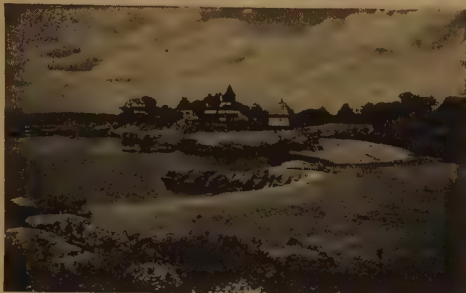
In spite of the hardships of pioneer life many of the settlers in all of the colonies prospered. Fine houses were built in the cities and towns. A few of the houses of the seventeenth century are still standing, and many which date back to the eighteenth. Some are excellent in design as well as in workmanship.

Some of the most beautiful houses are in the coast towns of New England which

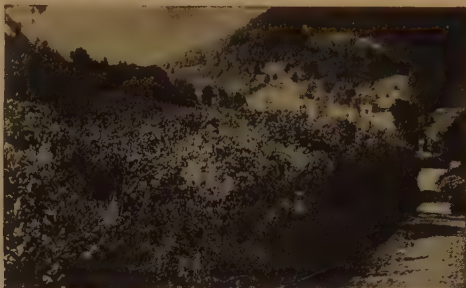


The Reverend John Harvard, the founder of Harvard College, is buried in Charlestown, Massachusetts. Photo, George Brayton.

NATURE IN VARIED MOODS



The shore at East Point, Nahant, Massachusetts.



A restful village in the green hills of Vermont.



Among the Adirondacks near Schroon Lake, New York.



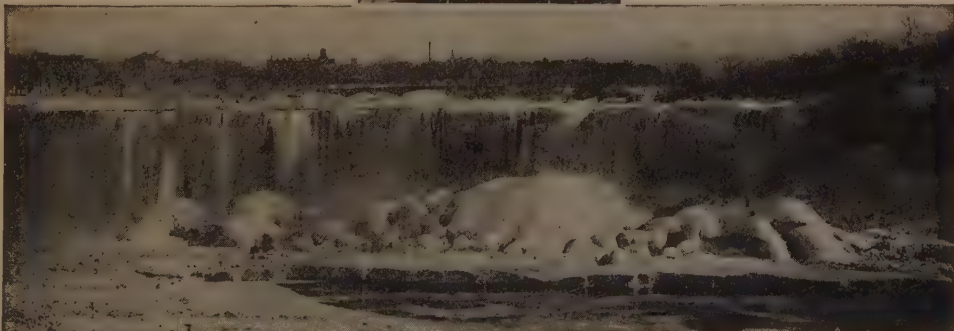
Concrete bridge crossing Wissahickon Creek in Fairmount Park, Philadelphia.



Echo Lake and Franconia Notch, New Hampshire.



Pockwackamus Falls in the Penobscot River, Maine.



Even Niagara must yield to the cold of winter. Here we see the falls in the grip of a force they cannot resist. The inset is the monument erected to commemorate the battle of Bennington, Vermont.
Photos of Nahant, Schroon Lake, Pockwackamus Falls and Echo Lake, Ewing Galloway, Echo Lake copyrighted; Wissahickon Bridge, Philip B. Wallace; others, courtesy Canadian National Railways.



Photo, Bicknell, Portland.

The library in the Longfellow house looks to-day much as it did in the poet's childhood.

were once important ports. For example, Portsmouth, New Hampshire, has several imposing mansions. In Salem, Massachusetts, the wealthy merchants and ship-owners built houses to fit their circumstances. Much of the elaborate carving was done by skilled ship carpenters. In rural towns there are also some fine old houses, and we shall show you some old Southern houses in other articles.

THE LARGE PROPORTION OF FOREIGN-BORN IN THE SECTION

For fifty years after the Revolution few foreigners came to the United States, but with the development of manufactures immigrants came in great numbers from the British Isles, Germany and other countries of Northern Europe. Toward the end of the nineteenth century the source of immigration shifted to Canada and to the countries of Central and Southern Europe. In 1920 there were nearly 750,000 persons of Irish birth in the section, and nearly 600,000 of German birth. These figures are surpassed by the later immigration. There were nearly 650,000 of Polish birth, nearly 940,000 of Russian birth, and over 1,175,000 of Italian birth. There were nearly a half-million persons of Canadian birth in New England alone, almost equally divided between French-speaking and English-speaking. In fact, a little more than half of all the foreign-born in the United States live in the eleven states of the Northeast.

Rhode Island has the largest percentage of foreign-born—29; followed by Massachusetts, with 28.3; Connecticut, 27.4; New York, 27.2; and New Jersey, 23.5. Pennsylvania follows, at a distance, with 16, while Delaware and Maryland have 8.9 and 7.1 respectively. The percentage

of foreign-born in the United States as a whole is 13.2. If we add to the foreign-born those of foreign parentage, the proportion is much larger.

In some of the states most given to manufacturing the proportion of native whites of native parentage is very low. In Rhode Island it is only 28.7; in Massachusetts, 31.9; in Connecticut, 32.5; in New York, 35.3; in New Jersey, 38.4. On the other hand, in New Hampshire it is 50.9, in Pennsylvania 54.5, and above 60 in the other states.

In general we may say that the foreign-born live chiefly in the cities and manufacturing towns. In some New England towns you may see signs in the shops, "English Spoken Here," but on the streets you will hear little English. In some sections of New York City and in some of the towns in Pennsylvania and New Jersey one hears little English, also. On the other hand, in the villages and rural districts the native-born are in the majority, though in some districts there are many foreign-born farmers.

It is clear, then, that the people of the section are quite different in race, religion and language from the population of a hundred years ago. We have not space to tell of all these differences here, but many books have been written on the subject, and you will learn more about them when you go to college.

In the old days the section as a whole was famous for its interest in education. In this there has been no change. More money than ever is spent for public schools, the section is full of famous private schools, and some of the most important colleges and universities in the land are located here. Many draw students from all parts of the United States.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 4307.



Photo, Bicknell, Portland.

The poet Longfellow was born in this house, in Portland, Maine, which is preserved as a memorial.

ALONG MASON AND DIXON'S LINE



The boundary between Maryland and Pennsylvania was run by Charles Mason and Jeremiah Dixon (1763-67). Of the stone markers every fifth one bore the Calvert arms on one side and the Penn arms on the other. The portraits are Cecil Calvert and William Penn.



Doughoregan Manor, one of the finest colonial mansions, is near Ellicott City, Maryland, and was the ancestral home of Charles Carroll of Carrollton, signer of the Declaration of Independence.



Stenton Mansion, Philadelphia, built in 1728 by James Logan, who was secretary to William Penn, is in care of the Pennsylvania Society of the Colonial Dames of America. Ridgely House (right), the oldest house on the Green, Dover, Delaware, was built the same year.

Photo, Philip B. Wallace.

Photos from original stone and Calvert portrait, courtesy Maryland Historical Society; Penn portrait, courtesy Historical Society of Pennsylvania; Doughoregan, by Hughes.

BEAUTIFUL OLD NEW ENGLAND HOUSES



Salem, Massachusetts, has many beautiful old residences. These are the George Robert Lord house, the Ropes house and the doorway of the Pierce-Nicholls house.

Photos, Mary H. Northend.



The Wayside Inn at South Sudbury, Massachusetts, made famous by Longfellow, has been purchased by Henry Ford, who is making a collection of relics of early America.

Photo, George Brayton.



Governor John Langdon House, one of the most beautiful houses in Portsmouth, New Hampshire.



The Shaw Mansion at New London, Connecticut, built in 1756 by the labor of Acadian exiles.

Lower pictures by De Cou; copyright, Ewing Galloway.

The Book of THE EARTH

WE have looked, in our story of the earth, at our own world and all the worlds in space. Two things are common to them all—the stuff that they are made of and the law that governs them. Here we begin a quick survey of matter and its laws—of chemistry and physics, as the textbooks say. We see the river gliding through the hills, the glacier pushing through the mountain slopes, the sunset on the Nile, and the hills ground flat like a sea of sand; and we think of the countless ages through which matter has been fashioned as we see it now. We see the swaying of a tree in the wind, the moon shining over the sea, the daffodils nodding their heads; and we think of the poetry and beauty that throb through matter everywhere. We see the wheels of industry, the rushing of motor cars, the mechanical heart of a ship at sea; and we marvel at the slaves man has made from matter.

THE WONDER OF MATTER

THROUGH many pages we have looked on the sun and moon and planets, and beyond them to other suns and the clusters of stars, to star-dust and to nebulae. It is time to bring our gaze from the skies to the ground we stand on, the earth on which we live and die, and to which we return. It is no long or sudden journey.

One of the discoveries of the twentieth century is that all those bright companions that we see are of the same stuff as our old earth. They are made of the same things; and we use the word "things" for a moment because it is a more common word than "materials," and has a larger meaning. But there is yet another word which does even better. The stars and the earth, the very instruments with which we spy the stars or examine the materials of which the earth is made—yes, and we ourselves who are the examiners—are all alike Matter. So that if we are asked what Matter is, our first answer must be: That of which all things are made.

It is not possible to put it more simply than that, because Matter, like Time and Space, is a word we use to convey an idea of something that is beyond explanation. If we want to go farther into it we have to be content with saying something *about* Space or Time or Matter—what qualities they

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have, what they are like. It is very hard indeed to do that about Space and Time; it is a little easier when dealing with Matter, because somehow we feel, we are certain, that Matter is not an idea, but is something that might still go on if there were no minds to have ideas about it.

For example, matter is something that lasts. It may be cut up into the tiniest fragments, and cut up again and again and again; but divide it to the uttermost, and it will still *last*—it will still exist. Again, matter takes up room; it always has a place in the world, or, as we ought to say, a place in the universe; and while it fills that place nothing else can fill it. Moreover, while filling that place in space it will resist the attempt to move it.

This rather long description of matter will be seen to be necessary when we peer as far as can be into the many forms it possesses. Look first of all about you. The chair you sit on, the glass of the window through which you look, and the streets and houses or hills and woods you look at, the rain that may be falling, or the clouds that are flying overhead—all these are forms of matter. They fulfill the conditions we stated of "lastingness" and of filling a space that nothing else can fill at the same instant, though their places may be changing, as the places of every-

thing really are. Perhaps you may say the clouds do not seem very lasting. Perhaps not, as clouds, but as particles of moisture the matter of which they are made is as lasting as anything else. As particles of moisture they may fall as rain and be lapped up by the soil, but the soil will send them down to be preserved in underground springs, or feed plants with them. Even if they are evaporated again by the heat of the sun, they will once more be formed into clouds. Whatever happens, they are indestructible.

**WHAT WE SEE WHEN WE THINK
WE SEE THE STARS**

Pursue matter to the stars. In the stars is matter also. We are sure of this because our senses and our minds bear witness to its presence. The stars endure as matter does. They take up room as matter does. We cannot touch them to find out whether they resist being moved, as a table does when we press our hand against it or as the ground does when we press it with our feet, but another sense comes to strengthen our belief. We *see* the stars. Yet wait a moment—*do we see the stars?* What is happening when we think we see them? It is not the star we see, but a message sent to our eyes by the light coming from it.

Let us get this clear. Light, though it travels more quickly than anything else, takes some time to come over great distances. It takes eight minutes to come from the sun. From many of the stars light takes hundreds, even thousands, of years to reach us and fall on our eyes, so that what we are really seeing is not the star, but some quivering of the light that left the star all those years ago; and if the star had then gone out, become black and lightless, still we should go on seeing the light it sent out before it perished.

**THE LITTLE GAME OF THE DIME
IN A JAR OF WATER**

Perhaps a simple little test which anyone can make will help to show what we mean. Put a dime at the bottom of a jar and then hold the jar so that when peeping over the rim you can only see the edge of the coin. Still holding it so, and keeping your eye looking over the rim at the same angle, ask someone to pour water slowly into the jar. The dime will then come into view. Yet it is not really the dime that you see, but the rays of light which, having been reflected from the surface of the dime, are bent as they come

out of the water into the air. That is what is called *refraction*. The point we wish to show is that when we speak of seeing matter we mean that *we perceive light that is sent out from matter*.

We see the moon, not by light sent out by it, but by light which comes from the sun and bounces off it, or is reflected from it, on to our eyes. We saw the dime in the same way. We see nearly all things on earth like that, though the light may come from a candle or an electric lamp which lights them.

But the candle and the electric lamp, when we look at them, send us the light-message direct. So does the star. That resemblance tells us that it must be matter in a state more like a candle or an electric filament than like a piece of wood or stone. It must be glowing. More than that, it must be in such a condition that it is able actively to be sending out light-messages on its own account, instead of passively reflecting them from elsewhere. What sort of condition is that?

**WHAT IS HAPPENING WHEN THE
BRAIN SEES A DISTANT OBJECT**

Let us think of another sort of thing perceived by our senses—sound. What is sound? It is not matter. It is not something that matter can part with and send from itself to us. When a piece of matter like a bell or a harp-string is sending out sound, what is it doing? It is shaking rapidly, vibrating. This vibration makes the air about it vibrate. The vibrations of the air make the drums of our ears vibrate, and when that happens, our brain *hears* a sound. Something like that is happening when the brain *sees* a distant object. The object—whether the gases about a candle wick when hot enough, or the filament of carbon or tungsten in an incandescent lamp when they are hot enough, or the gases in a star when they are hot enough—is quivering very fast and sending out vibrations.

But these are different from the vibrations of sound, which can be carried by air or by metal or by wood, or by any matter that will itself vibrate, but cannot be carried over a vacuum where there is no matter. The vibrations of light will travel through emptiness. But, because they are vibrations, and we cannot think of them as anything else, science has invented the idea of a something that would vibrate with them, and has called it the Ether. We shall often have to speak of

this ether, because we cannot at present think of anything else to explain how light-waves come across empty space. But we know nothing about it that we can prove. All we really know is that the light-waves are transmitted. When they reach the eye after their journey, which may be short or may be immeasurably long, they make an impression on the eye which is sent on to the brain, and the brain is conscious of light.

THE VIBRATIONS OF MATTER THAT MAKE US SEE LIGHT

In a general way we may say that the hotter matter is, the more likely it is to send out vibrations which make us see light; but we must guard ourselves by remarking that some of the bright spots in the sky, collections of gas or star-dust, do not appear to be very hot, and that such a thing as cold light is certainly known on the earth, as in luminous deep-sea fishes, or in glowworms. But for an illustration of what we first said we may take a piece of black carbon. When cold, it gives out no light and does not reflect much; but heat it up, and it first glows red, and then, as it grows hotter, it can be made to give out a white light, as in an electric arc-lamp. In the sun it is so hot that it becomes a gas and contributes its share to the sunlight.

WHAT HAPPENS TO A PIECE OF IRON WHEN IT IS HEATED

A piece of iron would serve as well to show what we mean. Cold and solid, it gives out no light from itself; heat it, and it glows with a red light; heat it more, and it becomes white-hot and melts into a liquid; heat it farther still, and it goes into a white-hot gas such as, again, is found in the sun. Here, then, is an example of three states of iron matter: (1) the solid state, in which the vibration grows more vigorous as the solid grows hotter; (2) the liquid state, in which vibration takes place freely; (3) the gaseous state, in which vibration is still more marked.

It is the same iron always; but why should it vibrate more in one state than in another, and how does it vibrate at all?

The only way to answer that question is to consider the iron not as a lump, but as built up of something movable, as a house or a wall is built up of bricks. If you glance at one of the many pictures in this book, you might think at first that it is made up of solid patches of black and

white; but if you examine the dark patch very carefully, you will see that it is made up of a multitude of tiny dots; and if you take a microscope to scan the white patches, you will find them broken up into all sorts of little pits. If the microscope could magnify a great deal, it would show that the paper is not solid at all, but rather like ragged lacework. There is no microscope so powerful that, when turned on to iron, it would show up the metal as made up of little bits; though there are some very powerful ones which will very nearly do so. But the bits of iron we have in mind are smaller than that.

SPLITTING UP THINGS TILL WE REACH AN INVISIBLE SPECK

We spoke just now of bricks, meaning bricks of clay. Suppose we were to pound these to powder. Suppose we were to take a grain of this powder and split it up again, and go on splitting up the fragments till we could get nothing smaller. Even then the almost invisible grains would be made up of something smaller still. So also would the smallest grains of iron which we could possibly arrive at.

But if we go on, in our minds, still splitting up and splitting up, we can imagine that at last we might arrive at an invisible speck of matter so small that it could not be split up any more. That is what, ever since the time of the Greeks, has been called an Atom, meaning "a thing which cannot be cut up into smaller bits."

A lump of iron is built of such atoms; the atoms of iron are its bricks. We can get some idea of what happens when the lump of iron grows hot. Its bricks begin to jostle one another; they move about; they vibrate. As the iron grows hotter the vibrations become more powerful and rapid. What happens then?

We can see by a story. Captain Scott, the Antarctic explorer, related how, when he and his companions were on sledge journeys, after they had packed themselves up for the night in a snow-hut, a shiver would seize one of them and would pass on through the whole party till all were shivering. When the atoms of the iron are all shivering—not with cold but with heat—the shivering is passed on to anything which may be next to it and touching it. It may be air or water or other iron or, in fact, any gas or liquid or solid; in any case they will get the shiv-

ering—they will receive the heat which the atoms of iron are passing on. If the iron is so hot as to be melting, the atoms are moving still more rapidly; if it evaporates into the gas of iron, then there is no holding the atoms, so furious are their movements. Before going on we must say that the movements of the atoms of iron, or of anything else sending out heat, are not those which send out light.

THE THREE STATES OF BEING IN WHICH EVERYTHING MAY EXIST

What we should be thinking of now is the behavior of these atoms which are capable of moving about. But, first of all, let us remember that iron, of which we have been speaking, is not alone in existing as a solid lump, a molten liquid mass or a gas. Everything we know has those three states of being. Air can be cooled down till it becomes a liquid, and then cooled down still farther till it becomes a solid which looks rather like ice. Hydrogen gas, which is the lightest gas we know, can also be cooled into a liquid and frozen into a solid. Two hundred miles above the earth it is so cold, in spite of the rays of the sun which are traveling through that empty space, that everything on the earth would be frozen solid if it were there.

THE THING THAT IS TRUE IN ALL THE DEPTHS OF SPACE

The same would be true in all the depth of space between ourselves and the stars. On the other hand, everything we know on the earth—every metal, every rock—would, if plunged into the sun or into one of those stars, be immediately melted into liquid and evaporated into gas, as if it were boiling water. The sun and the stars are not all gas, though all we see of them are the clouds of gas covering them; in their depths the pressure is so great that the gases are compressed into liquid again, or into solids. But without going farther into that, we may now understand that all through the universe that law holds good. On the sun, on the moon, on the farthest star, those invisible particles which are the bricks of matter may be built up into many forms—now a gas, now a liquid, now a solid; but every gas may become a liquid or a solid, every solid a liquid or a gas, every liquid a solid or a gas, without ceasing to be the same matter. The particles are the same; all that is altered is the *state* of their being.

It is difficult when we cannot see things to tell what they are doing. But we can reason out their numbers and their movements best by observing the behavior of them when assembled in gases.

It is quite easy to believe that gases are made up of particles which can move about freely, because if we turn the illuminating or fuel gas on, the smell of it will quickly warn us that its particles are spreading fast all through the room. Moreover, if we take a balloon that is closed, and heat it, it will swell even to bursting. That is because the heat has made the particles of the air fling themselves about more wildly, so that they are kicking violently against the walls in their effort to get more room.

THREE HUNDRED MILLION ATOMS THAT CAN LIE IN AN INCH

From many other experiments we have been forced to believe that in a gas the particles are always moving. Here let us say, in order to avoid confusion farther on, that the particles of most gases are spoken of, not as atoms, but as molecules, molecule meaning "a little mass." There is a difference, as we shall see later. These atoms, or molecules, are, of course, actually matter just as much as golf balls are matter. They are so small that they cannot be seen apart, but there are very many of them, and they move very fast. What is their size?

That is not a question that can be answered exactly, because an atom is not always of the same size. But on the earth a hydrogen atom is so small that we could put 300 millions side by side in an inch. What does it weigh? Well, there are 7,000 grains in a pound. Let us take a quantity of hydrogen equal to about 23 of these grains in weight. How many atoms will it contain? If the atoms were made up into bundles of a million million, and then we took a million million of these bundles, we should then have as much hydrogen as these 23 grains would weigh. Other atoms weigh more than the atom of hydrogen, but they do not weigh very much more. The atom of oxygen is 16 times as heavy; but an atom of lead is only about 200 times as heavy. So that in 23 grains of lead there are more atoms than any person could ever live to count. For if you counted five atoms every second, and went on counting from the time you were ten years till you were seventy, omitting only

Christmas and the other legal holidays, you would count less than 10,000 millions—not a hundredth part of the numbers in one bundle.

AS MANY MOLECULES IN A RAINDROP AS THERE ARE RAINDROPS IN AN OCEAN

These figures do not bring before the mind very well the vast multitude of atoms that are in every grain of matter; but such large numbers never do. We might put the matter more picturesquely by saying that there are as many molecules in a raindrop as there are drops of water in the Mediterranean.

But do not think that these atoms are closely packed. On the contrary, they have room to move about, and they always are moving about. At the ordinary temperature of an ordinary day each atom, or molecule, of the air is charging along at the rate of 1,600 feet a second. In hydrogen the particles move faster: they move at the rate of a mile a second. But the molecule of air does not long enjoy a free path before coming into collision with others; it travels for no more than one two-hundred-thousandth part of a second before it is knocked out of its path. In its zigzag journey it changes its direction nearly 5,000 thousand million times a second.

WHAT HAPPENS TO THE MOLECULES WHEN WE STIR A LIQUID

All these happenings seem quite likely. But it is not so easy to picture their happening in liquids, and still less easy as happening in solids. Let us say quite frankly that, while the movements of the particles and atoms and molecules of gases can in some ways be made manifest to our *senses*, when we come to liquids these movements are manifest only to our *minds* and to our *reasoning*.

It is quite clear that the molecules of a liquid can move about; for if we mix vinegar and water, the two mingle; their molecules diffuse themselves in one another, as we say. Moreover, as liquids can be stirred, we must suppose that their molecules roll over one another. When the stirring is stopped, the liquid stops its general movement. But if left to itself, an ordinary liquid will in course of time evaporate, so that its molecules evidently can move off. The molecules in a liquid are more sedate in their behavior than the molecules of a gas. There is a continual movement going on, every particle is always moving on and on and re-

turning; but its journeys occupy, not millionths of a second, but parts of a day.

With solids it is the evidence of our senses that tells us that molecules move and that they diffuse even as liquids do. Years ago plates of gold were placed on plates of lead, and *grains* of the gold penetrated into the lead. But the diffusion takes years instead of hours or days, and we have to rely on our powers of reasoning to understand how the molecules move about in solids. In fact, we have to take to mathematics to arrive at the number of movements a molecule of iron makes in a second. It is about 30,000 millions.

ELECTRONS IN THE ATOM LIKE FLIES IN THE DOME OF ST. PETER'S

We have now examined what is happening to the small bricks of matter, the atoms or molecules. Up to almost the beginning of the twentieth century it was supposed, as a matter of reasoning, that nothing smaller than such atoms could exist; they could be divided up no farther. That is no longer believed. The atom is itself made up of something else, something smaller, something less tangible, something that is like the ghost of matter. It is called the electron, and the electrons in the atom are like flies dancing in the dome of St. Peter's. And what is the electron?

As far as we know now, an atom is made up of particles of positive electricity called protons and particles of negative electricity called electrons. Usually each atom would be made up of a certain number of electrons and protons. But it has been found that electrons may be added to, or subtracted from, the total number of particles in the atom. Then a current of electricity is set up in the atom. That is something to think about.

Is the electron, which Professor Millikan while at the University of Chicago was able to isolate and measure, the beginning of matter? Is it power? If so, we must no longer ever think of matter as solid. Rather must we think of it as something like the description of a net—a number of holes tied together with pieces of string. But we must imagine all the string cut away, and nothing but knots left. The knots are the electrons; knots of force, of energy, of power. The whole Universe, and all its Matter is knotted together with Power.

THE NEXT STORY OF THE EARTH IS ON PAGE 4289.

HAMBURG, THE HOME OF GERMAN COMMERCE, AND BERLIN, THE GERMAN CAPITAL



Hamburg, the greatest commercial centre and seaport in Germany, is shown in the upper picture. It is one of the principal commercial cities of the world, and was founded by the Emperor Charlemagne. It is built on the river Elbe, and from its mighty docks great liners go to all parts of the world. The lower picture shows Berlin, the great political centre of Germany, and the capital of Prussia and the republic. It is not an ancient city, but is becoming one of the most imposing cities in Europe, with its many fine public buildings and monuments and its splendid avenues. The building on the left is the new cathedral, and the one on the right is the royal palace.



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GERMANY AS IT IS

THE name of any country calls up some picture before your eyes. Canada suggests the waving fields of wheat stretching across illimitable prairies against a background of towering mountains. Russia brings up a vision of wide steppes rolling far away to the horizon; Egypt a scene of desert sands; France the resting-place of our heroic dead. The name of England brings a vision of quiet fields and sleepy villages. And although everyone knows that these names really mean many other things—bustling docks, crowded warehouses, a hundred towns blackened with factory smoke—still the first thought they suggest is usually a restful picture of quiet nature.

What picture does the thought of Germany evoke in the mind of the German settled far away, say in Cincinnati? First it will be a scene of forest-clad hills, hardly mountains, but often bold in outline, embracing rich valleys with towns and villages clinging to the sides of tranquil streams that link them with the great world.

The Germany that lives in the heart of the German, and in the mind of those who have wandered in Germany and have studied its literature is a

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forest country: the Black Forest, where the charcoal-burner's hut is still found

among the pines; the Thuringian Forest, where the old emperor Frederick Barbarossa sits in his mountain tomb at a stone

table, round which his beard must wind itself three times before a new Germany can arise; the forests of the Bavarian highlands, where the huntsman's yodel is heard on the hills, and the sound of the cowbells from the pastures above the pines floats down to the lower levels.

Or, again, it is the country of the mighty oaks and beeches of the Woodpecker's Forest, inclosed in a deep bend of the Main; or still again the pine-clad Harz Mountains in the very centre of old Germany, where Luther hid from Charles V, and vanquished Satan with an ink-pot. Or perhaps the German far away remembers the woods outside the great cities like Berlin and Frankfort and watering-places like Homburg, where all the paths are set with rustic seats, and are sure to lead in the end to an open-air café.

The forest is undoubtedly the most characteristic of the natural beauties of Germany. Until about the year 1000 a great part of southern and cen-

tral Germany was still primeval forest, and the land there would easily to-day return to its natural condition. That is why the Christmas tree is more a national symbol in Germany than anywhere else; the tiny fir tree brought into the house is the symbol of the primitive forests which lasted later in Germany than in any other land of Western Europe.

And closely allied with the vision of the wooded hill-country is the picture of the great rivers which have made the fertility and to a great extent the prosperity of Germany. Of these great rivers, the Rhine, the Weser, the Elbe, the Oder and the Danube, none except the Weser has its course entirely within German borders.

THE WONDERFUL PAST OF THE MIGHTY RIVER RHINE

The Rhine has been a highway of commerce for centuries, as we see from the ruined castles of the medieval barons who preyed on that commerce. It is still a great highway, and by a wonderful system of canals is linked up with the French river-system, on the one hand, and the Weser and the Elbe, on the other. Big ships go up as far as Mannheim.

It is on the Rhine that the German river legends crowd closest, especially on the stretch passing through the narrow gorge between the hills from Bingen to Bonn. There the valley begins to widen out into the plain stretching away northwest to the flats of Holland. Near St. Goar the Lorelei sings her magic song, which lures to destruction the simple fishermen; and close by it is the spot where Hagen is said to have flung into the river the precious hoard of the Nibelungen brought by Siegfried for his bride. The Main, the Neckar, and a hundred others have their legends. There is in the Harz the laughing Ilse, whose loveliness is explained by the story which declares her to be a princess.

THE GREAT HIGHWAY FROM GERMANY TO CENTRAL AND EASTERN EUROPE

The great rivers of the northern German plain are less romantic, but they are important to the greatness of Germany. The Elbe and the Oder take their rise in Bohemia, and make their way through gorges in the Bohemian mountains down to the German plain. These are the natural outlet of Czecho-Slovakia to the sea, and link up Germany very closely with the states made up from the fallen Austrian Empire. The Danube is a Ger-

man river in its upper course, and forms a natural highway for Germany toward Central and Eastern Europe.

The idea of Germany as a country of forest and of mighty rivers is right, because it is really at the bottom of the national feeling for the German fatherland. But it is only one aspect of the truth, for Germany is a great industrial country, the only European country before the war which seriously rivaled sea-going and industrial Britain. Her area is now less, her coal and iron resources have been seriously decreased, and her remaining coal is largely promised to France. Her population is also decreased, though the removal of non-German people in Poland and Lorraine is not a real misfortune for Germany. If Russia is left out of the reckoning, she still has the largest population of all European countries—nearly sixty millions. Her area of 182,271 square miles is exceeded only by Russia and France. She has still very great natural resources, and perhaps the greatest of all her possessions is the industrious character of her people, their love of order and good government, and their high attainment in all kinds of learning.

THE FOUR NATURAL DIVISIONS OF THE GREAT GERMAN HOMELAND

If we look at the map of Germany we gain some idea of what Germany is like. There is the romantic Germany of lake, mountain and forest; the industrial Germany which built the crowded towns of the Ruhr basin with their mighty steel works and their great textile mills; and sea-going, commercial Germany which built the Hamburg-American vessels, and in the Middle Ages formed the union or league of free trading cities.

It is perhaps easiest to think of Germany as falling into four divisions.

There is the Bavarian plateau, cut by deep river gorges, which slopes down from the Alps to the Danube, and with Württemberg and Baden, is a sub-Alpine country.

There is the basin of the Rhine in its middle course, a region of wooded hills and fertile valleys so sheltered that the vine grows, yet widening out into a great plain studded with busy industrial towns.

There is the mountainous and thickly wooded country of central Germany, ending in the Harz Mountains, from the summits of which we look down on the vast northern plain sloping to the North and the Baltic Seas.

THE BEAUTY OF GERMANY'S INLAND WATERS



The beautiful Rhinestein castle.



A castle above St. Goarshausen.



The mountains rising above the Lake of St. Bartholomew in south Bavaria.

There is this plain itself, the fourth of the natural divisions of Germany, forming part of that great European plain which stretches almost uninterruptedly from the widespread mouths of the Rhine and the Maas in Holland to the Urals on the frontiers of Asia.

This great northern plain of Europe, with its rivers and lakes, is a very different scene from the romantic landscapes of southern and central Germany. The people are different, too, different by race and temperament. There is a strong Slav element in the basins of the Oder and the Elbe, in contrast with the purer German extraction of the southerners. The difference between north and south Germany has been increased by the natural conditions under which the two peoples live. It has been also sharpened by their history, which placed them until 1870 under different political systems. The German-speaking people of Austria remain separate politically to this day. Then there is the difference in religion; broadly speaking, north Germany is Protestant and south Germany and the Rhineland mostly Roman Catholic.

THE PRUSSIAN IN THE NORTH AND THE GERMAN IN THE SOUTH

The Prussian northerner is more vigorous, less democratic, less easy-going and less tolerant of the ways of other people than his south German brother. The difference is commonly expressed by saying that the south German is *gemütlich* and the north German is not. *Gemütlich* means comfortable, easy-going, finding happiness in the home and in simple pleasures, sociable, and inclined to a general friendly relationship with one's fellows. The word describes the temper of a man who is not so absorbed in business that he has no time to be happy and friendly. Quite a different idea of life from the Prussian ideal, which is all for wealth and efficiency.

In looking at the different parts of Germany, the people who inhabit them, the work they do, and the life they live, it is easy to be impressed by the broad contrasts. But we must remember all the time that, however different their conditions of life, the Germans are still bound together by strong bonds of race, language, tradition and business and economic interest. These bonds are made all the stronger by the cutting-off from Germany of the non-German peoples.

Germany has always been much more able to feed herself than Great Britain is. It is true that she has had to import a certain amount of wheat and meat since she developed huge industrial towns, but her position in Europe between two possibly unfriendly states, France and Russia, made her statesmen realize that at any time she might have to feed her people from the resources of her own soil. Every effort was made, therefore, to produce as much food as possible.

THE POOR SOIL THAT HAS BEEN MADE TO YIELD ITS HARVEST

The soil of northern Germany is not, on the whole, fertile, and has to be extremely well cultivated to yield what it does, but if we pass through northern Germany we see how the industry of the people makes the best of a light and sandy soil. In what used to be Russian Poland we see poor wooden houses and fields where only a few odd shocks of rye tied up like straw-covered bottles stand here and there. Then as we cross the border of what was once German Posen, and is now Poland, we see neat and prosperous villages with good houses; fields where the shocks of rye stand in serried rows as the wheat shocks do in an American field; and long straight, well-made roads bordered by apple, cherry and plum trees. Right on through north Germany, to Berlin and beyond, the same order and prosperity are evident.

Running roughly east and west through this northern area is a slight swelling of the plain clad by pine forests, which is the water-parting between the tributaries of the great rivers and the small streams which fall into the Baltic. If the traveler enters by Königsberg and Danzig he will get a glimpse of the charming coast line of the Baltic, with the curious lagoons at the mouths of the rivers nearly inclosed by sandy strips. Pomerania, Mecklenburg and Brandenburg have a large area covered by small lakes, which vary a landscape otherwise rather dull. Perhaps the prettiest spot in the northern lowlands is the island of Rugen, opposite Stralsund, on the Baltic coast. It is a favorite place for holiday-makers.

West of the Elbe the plain stretching to the Dutch border is rather different. The shores of the North Sea are less picturesque than the Baltic coast. For a narrow strip round the river estuaries there is rich land, and around the Dollart and the Jahde

A FAMOUS RIVER AND A FAMOUS FOREST



The "lordly, lovely Rhine," about which so many poets have sung so often, is one of the playgrounds of Europe. A favorite spot is Bingen, "fair Bingen on the Rhine," with its mouse tower, shown here. It is here that the wicked Bishop Hatto is said to have met his fate, as told in the poem by Robert Southey.



The Black Forest, which stretches for about a hundred miles along the Rhine, is full of lovely valleys and wooded heights. The forest has many busy mining centres, and, with its network of narrow valleys and its countless trees forming a barrier to the passage of an army, was part of the great scheme of defense of the German Empire. This picture shows the lovely village of Nussbach nestling among the trees.

Photos, Photochrome Co., Voigt, Frith, Beckett, E.N.A.

Bay there is soil which was an old sea-bottom, and is treated very much as the Dutch polders have been treated. On the sandy soils of Hanover and Oldenburg are huge areas of moorland where nothing grows but heather and moorland plants. Part of this country has been planted with pines, and here and there the land has been cultivated at great expense.

The Rhineland and the valleys between the highlands of central and southern Germany are much more fertile, as are the southern areas of the northern plain. On the Bavarian plateau, again, the land round the rivers is fertile, but there are great stretches of bog and moorland.

THE HARD-WORKING FAMILIES ON THE SMALL FARMS OF GERMANY

But whether the land is fertile or infertile, every possible acre of land is used. The system is different from ours. Except in the northern provinces of Prussia, which is the granary of Germany, there are no large farms. The greater part of Germany is divided into what we should think very small holdings of from five to ten acres, and the number of farms over 250 acres, which in this country would be very small, is decreasing.

The peasant farmer does not live in an isolated house on his plot, but usually in the village. In the Rhineland or in Bavaria, where small farms are the rule, the hillside above the village looks like a chessboard of allotments, rather than like farm land; for it is divided into a multitude of strips, each with its own crop of grain, beet, roots, hay or clover. Each farmer tries to grow what he needs for his family and his live stock.

Not only the man works, but his wife and family. Throughout Germany the women do a large share of the farm work, and in many cases the man works at some other trade while the woman looks after the holding for part of the year. Laborers who work for hire on the bigger farms often work at a trade during the winter, generally one connected with the land—in the sugar factory or the potato distillery.

THE GREAT VINEYARDS ALONG THE SHELTERED BANKS OF THE RHINE

In the Black Forest, on the other hand, and in Bavaria the peasant people make in their own homes the clocks and wooden toys that we see in the shops at Christmas, and so add to their scanty earnings.

Rye is the chief grain crop in Germany, because the light and sandy soil of the

north is best suited to rye, and the winter is rather too severe for autumn-sown wheat. But wheat is grown in the south. There are vineyards on the sheltered banks of the Rhine, from the Swiss border down to Cologne, as well as on the Main, the Neckar and the Moselle. Potatoes are grown everywhere for food, and also for the distilleries. Large quantities are made into potato flour. Another very important crop is sugar beet. The most important sugar-growing area is between the Elbe and the Weser, the Saale and the Aller, around the Harz Mountains.

In the minerals necessary for industrial production Germany was very rich before the war. She has lost the greater part of the Upper Silesian coal to Poland, and for fifteen years the rich seams of the Saar valley on the borders of Lorraine and the Palatinate belong to France. There remains the hard coking coal of the Ruhr valley in Westphalia, which is necessary to the steel industry. It was around this coal that the fierce struggle in the Ruhr was waged by the French Government. There are small coal-mining areas between Hanover and Minden, and between Zwickau and Chemnitz, and near Dresden in Saxony. Central Germany has also large supplies of the lignite, or soft brown coal, which is made up into briquettes.

THE MANY KINDS OF MINERALS THAT MADE THE WEALTH OF GERMANY

Wood from the German forests, the greater part of which are under state management, is used for domestic heating. In German houses there are practically no open fires, but each room has its tall, closed stove. In the new-fashioned houses there is central heating as in America, but generally the Germans use stoves burning wood for fuel.

In addition to coal, Germany has iron, copper, lead, zinc and salt, and even small quantities of silver. The silver is found in the Harz Mountains. It is the presence of the more valuable metals in the mountains of central Germany that has given rise to the many stories of the elves which haunt those places. Next to coal and iron, rock salt is the most valuable of the German minerals. The Stassfurt mines in Prussian Saxony yield not only common salt, but large quantities of the potash salts so useful to the farmer.

Naturally, the big manufacturing towns have sprung up on the coal-fields. In the Ruhr area they stand as thick as in the

THE OPEN-AIR LIFE OF GERMAN CHILDREN



The Germans pay much attention to the health and education of children, and they are always thinking out new ideas for schools. Open-air classes like this one studying botany were first started by them.



All German children are taught that it is important to live as much as possible in the open air, and here we see a German mother with her children and their nurse taking their midday meal in the garden.



This is a familiar street scene in many German towns, and we can see how the children look as they go to, or come from, their schools. The tradesmen's carts are drawn about many of the cities by big dogs.

English Black Country. There are Elberfeld-Barmen, Dortmund, Düsseldorf, Bochum, Essen, Duisburg, Solingen, and, on the other side of the Rhine, Gladbach and Crefeld, names which are known all over Europe for the manufacture of steel, machinery, textiles, electrical goods and a host of other things. It was here that the huge munitions industry of Germany had its headquarters. Though that manufacture has stopped, and Krupps at Essen turns out no more guns, the works, employing over 40,000 men, have been made over for peaceful production.

This great area depends for its supply of iron chiefly on the iron-fields of Lorraine, which are now the property of France. It is because these two districts depend on each other that all the difficulties have arisen in the settlement of this part of Europe. The trouble is that the new national boundaries do not agree with the economic life on which the people of the two areas depend.

THE RAPID GROWTH OF MANY TOWNS IN THE VALLEY OF THE RHINE

German industry here made enormous strides between 1870 and the World War, and during this period the population of the Ruhr area was nearly trebled. Industry has grown very rapidly in other districts. Any grown-ups who remember the towns in the Rhine valley below Bonn and on the Main at the end of the last century will be struck by the enormous growth everywhere. Little sleepy towns have put up factories, and with them new workmen's suburbs, and the places are almost unrecognizable. The whole of this district is excellently equipped for industry in another way. It has not only excellent railway services—Cologne is one of the most important railway centres in Europe—but the Rhine allows the carriage of heavy goods up as far as Mannheim. Northward heavy goods are carried direct by water to Rotterdam, or by the excellent canal system to Hamburg and Bremen.

Another very important industry in the Rhine and Main area is the manufacture of chemicals, and of those dyes in which the Germans excel all other nations. They have been compelled to yield up some of the secrets of the dye industry, but it is still a very important item in the prosperity of Germany.

The other great manufacturing centre is on and near the Saxon coal-field at

Chemnitz, Breslau, Leipzig and Meissen. Here there are textile mills, paper mills, and porcelain and china factories supplied with material from the local supplies of clay and silica. Leipzig is the centre of the book trade. It is also famous for the annual fairs where trade is carried on especially with Russia and the countries through which the Danube runs.

The coal-field of Upper Silesia, only part of which is now included in German territory, is another great centre of industry. The manufacture of cotton and linen goods, and of all sorts of things made from metal, is carried on in the towns.

Generally speaking, the conditions under which the German workmen carry on their work are very good. The factories are fitted with the best and newest machinery. Provision made for insurance and unemployment is very good also. Since the Revolution every factory has a committee of workmen, which has a great deal to say about the management of the factory in so far as the workmen's welfare is concerned. At the pithead in the coal mines of Silesia there are baths where a miner can wash and change before he starts on his bicycle for his home in the village, often some miles away. The good standard of living of the German workman was gravely threatened by the terrible condition of the country since the war. It may be that poverty will compel the giving-up of many good things in German industrial life. It is part of the price of war.

THE SHIPBUILDING YARDS IN THE GREAT SEAPORTS OF GERMANY

Then, in the last fifty years, Germany has built up a great shipbuilding business. The yards of Hamburg and Bremen, of Kiel and Stettin, are fitted up with every modern device. Hamburg, Bremen and Lübeck were all of them free cities, and have been great trading centres for centuries. The commerce of the first two cities is now greater than it ever was in the Middle Ages. Trade on the Baltic and North Sea ports has been enormously assisted by the construction of the Kaiser Wilhelm Canal. This is a waterway sixty-one miles long allowing the passage of big ships direct between the North Sea and the Baltic from the mouth of the Elbe to Kiel Bay. It saves the long and tiresome voyage round Denmark.

These great ports are as important to German world-trade as the great factory

PROCLAMATION OF WILLIAM I AS GERMAN EMPEROR AT VERSAILLES



This is a picture of the proclamation of William I German Emperor during the Franco-Prussian War. In the first rush of victory, after the defeat of the French armies, it was proposed that all the German states, except Austria, should federate as an empire, of which the Prussian king should be emperor. The proposal was adopted, and the new emperor was enthusiastically proclaimed in the great hall at Versailles, on January 18, 1871. The man at the emperor's right—a little behind him—is Crown Prince Frederick, who afterward reigned as emperor for a few months. The man below the dais, in a white uniform, is Prince Otto von Bismarck, the first chancellor of the new empire, and the force behind William white king of Prussia. He made the empire possible, and continued to serve the emperor faithfully.

towns of the Ruhr. Hamburg is always said by the Germans to be the most English of their cities. It is certainly a fine city, and has a peculiar beauty of its own because of its magnificent waterways. It is the greatest port of the mainland of Europe in respect of trade with America. Indeed, before the war it stood fourth among the ports of the world.

Germany's principal towns outside the coal districts grew up before the development of this industrial activity. Though all of them are now to some extent industrialized, and have a large factory population, they began to be great for reasons outside industry. Berlin, however, the capital of the Reich, is a comparatively new city. It has grown to cover twenty-four square miles; it is laid out on the most modern lines, and the Berlin people are very proud of it.

THE SMALL TOWNS THAT ARE RICH IN ART AND LEARNING

But Berlin is not to Germany what London is to England or Paris to France. It is, after all, only a little over fifty years since the present Germany was born. And, although the War of 1870 raised the Prussian king to be German emperor, and made the Prussian capital the capital of the Reich, the older and prouder cities never admitted any leadership in art or culture or society as the cities of other states do to their capitals. The greater of them, Dresden, Munich and Stuttgart, with their magnificent theatres, opera houses and art galleries, hold their own against Berlin to this day. Nevertheless, as time goes on, Berlin increases its hold steadily even on these older cities, and there are now in Berlin more students than in any other German university. But the old, quiet German tradition is best studied in a smaller town, such as Weimar or Darmstadt, or in one of the quieter university towns, such as Göttingen, Heidelberg or Jena. Here the official and the professor still count for more than the rich industrial magnate. Here there is still time for a long rest in the middle of the day. Here there is leisure to study the art of living.

In some of the historic centres of German culture the old and the new exist side by side. Nuremberg is a good example. The ancient town, with its medieval castle, is still surrounded by the old wall with its towers and its moat, though the moat is now dry. Nuremberg was a

free city of the Empire in 1219. Its churches date from the Middle Ages, but most of the timbered and gabled houses which give the place its charm date from the fifteenth and sixteenth centuries. They are richly decorated with statues and emblems in the taste of the Renaissance, and many are built round wonderful arcaded courtyards.

Outside the old town stretches a great commercial city, one of the most important in south Germany for the production of machinery, metal work, pencils, beer, toys, clocks and so on. The same contrasts are to be found in Frankfurt-on-Main, where the old Ghetto and the quaint market place still belong to the Middle Ages. They are set in the midst of a modern city with a circle of gardens and boulevards. Here, too, chemical, electrical and railway works have transformed the life of the place, which once depended chiefly on being the home of the great Jewish banking houses. Some of the best examples of the old patrician houses of the thirteenth century are to be found in Ratisbon, whose position on the Danube made it an important place even in the time of the Romans. These houses, flanked with towers, in some cases still bear the coats of arms of the original owners.

CITIES THAT WERE FAMOUS IN THE FAR-OFF DAYS OF ROME

The towns of the Rhine basin, from Carlsruhe down to Aix-la-Chapelle, bear a different stamp, as the people do. The whole of this district was thoroughly Romanized in the early centuries of the Christian Era. After the fall of the Roman Empire it became the seat of the Christian Empire of Charlemagne. Roman and Christian influence was continuous there. It has remained Catholic, and the cities bear the stamp of their origin.

Among the oldest and most famous towns of this Rhine country are Aix-la-Chapelle, Treves and Cologne. Aix, celebrated since Roman times for its hot medicinal springs, was the favorite residence of Charlemagne. Its cathedral was built in the eighth century, and the town hall, built of the stones of the old imperial palace, dates from 1333. Aix, too, is now a great industrial city, with ironworks and many other industries. Older than Aix is Treves, with vast Roman remains more imposing than any north of the Alps except those in the Roman cities of French Provence, such as Orange.

FINE OLD CITIES OF NEW GERMANY



Dresden is one of the most beautiful cities of Germany, and has been called "the German Florence." It is a great centre of education and music, and its museum is one of the finest modern buildings in Europe. "Dresden china" was first made, not at Dresden, but at Meissen, a town some distance away.



The ancient city of Cologne dates back to times before the Romans. Its fine cathedral, the towers of which show in the picture, was begun in 1248 and only completed in 1880. Cologne is joined to one of the suburbs across the Rhine by the bridge shown here, which was opened in 1916 and took the place of the famous Bridge of Boats, which had provided a means of crossing the river for many years.



Coblenz, one of the principal fortress towns of Germany, is built where the Rhine and the Moselle join, and it gets its name from that fact. The Romans called it Confluentes, which means "flowing together," and the German name has come from the name given by the Romans. The fine old palace of the archbishop is now used as a factory. The headquarters of the American Army of Occupation was at Coblenz.

Cologne has a character all its own. Its chief glory is the magnificent Gothic cathedral, which represents the devoted labor of generations of craftsmen spread over six centuries. It was only finally completed in 1880. Cologne is the holy city of Germany. Medieval Cologne was said to possess as many churches as there were days in the year. In one of them are reputed to lie the bones of 11,000 English virgins massacred near Cologne when on pilgrimage to Rome. In another the Three Wise Men who went to Bethlehem are said to sleep.

THE HAPPY PARTIES OF CHILDREN WHO RAMBLE THROUGH THE COUNTRYSIDE

In Germany nearly all children attend the state schools, and the boarding-school, which plays such a large part in the education of boys and girls in England, does not exist. Children go to the elementary schools at six and stay there till they are fourteen, and if they then go to work they have to attend continuation schools for another three years. Many, however, go on to secondary schools.

School hours are early, and boys and girls have to be at school at seven in summer and at eight in winter. They take lunch with them, and return home for dinner at about two o'clock. At the weekend there are not so many games as in this country, but there are many excursions for Saturday and Sunday. German children are often organized as "Wandering Birds," and they take rambles in the country in parties. These rambles are sometimes for the day, but in the holidays they cover longer periods.

All through the summer there is much pleasant open-air life in Germany. One of the things in which the Germans excel is town-planning and the laying-out of gardens. In these public gardens there is always a big outdoor café where people can sit listening to a good orchestra.

THE LOVE OF MUSIC THAT IS BORN IN THE GERMAN

Music and the theatre are regarded as a part of education, and the enjoyment of these things is easier and more widespread than in this country. Concerts are cheaper, and even in small towns there are good series of orchestral and chamber-music concerts. Every town of any pretensions has its municipal theatre, with seats at reasonable prices.

Although the Germans take their pleasures very much in public, and are in this

way less formal than we are, they are much more ceremonious on occasions. At christenings, communions, betrothals, marriages and deaths there are great gatherings of family and friends, with much giving of presents. There is a definite programme, and the whole thing is carried out just as it has been done for generations. In all these ways the Germans are much more formal than we are, but in ordinary everyday life they are much freer. There is no regular breakfast in Germany; a family straggles down to coffee how and as it likes. Dinner in the middle of the day is a more serious meal, and is followed by a rest. In the afternoon there is coffee. Supper is a very simple meal. The servant, if there is one, is more like one of the family. She wears no cap and apron, but she works much harder than our maids. The children in ordinary homes live all the time with their elders.

Germany has played a great part in the intellectual and artistic life of Europe because of the interest of her people in learning and the arts. In music there are the great names of J. S. Bach, Beethoven, Mozart, Schubert, Schumann, Mendelssohn, Wagner, Strauss—these represent a great tradition. In philosophy and applied science German thinkers and workers occupy an equally high place.

THE SPLENDID EDUCATION THAT IS AVAILABLE FOR ALL

Life is simpler in Germany, although Berlin prides itself on being as dangerous and as gay a capital as any in Europe. But throughout the country the very rich are fewer, and everyone who wants a good education can have one, for school and university fees are very low.

The poor student in the university has always formed a large element of the university, but no one ever thought the worse of a student for being poor. The trouble is that since the war Germans are so much poorer, that the people who used to make a point of helping some poor student by inviting him on one or two days a week to a regular meal are now so poor themselves that they cannot help education in this way. It is one of the things that war has changed—one of the thousand ways—when not only Germany but all the world is suffering from the insanity which has brought our civilization toppling down.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 4407.

PICTURES OF GERMANY



THE BRIDGE OF BOATS ACROSS THE RHINE AT COLOGNE



THE SCHLOSSPLATZ AND THE IMPOSING NEW CATHEDRAL AT BERLIN



THE OLD TOWN OF HEIDELBERG



OLD HOUSES IN THE DOMPLATZ AT FRANKFORT-ON-MAIN



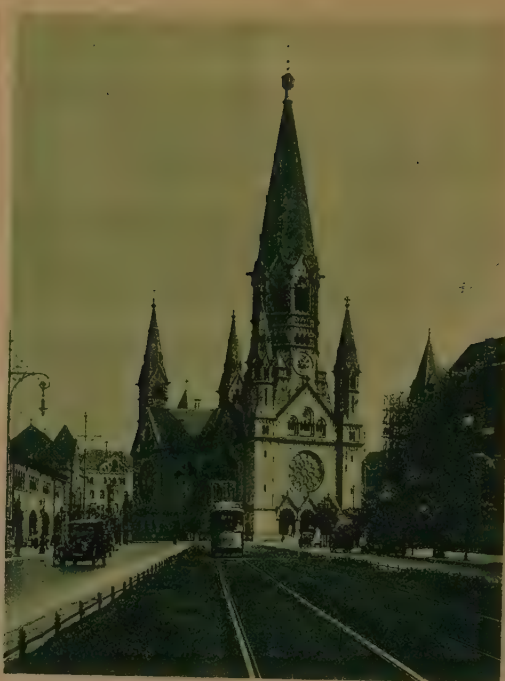
AN OPEN SPACE IN MUNICH, THE CAPITAL OF BAVARIA



A QUAIN CORNER OF NUREMBERG, IN BAVARIA



A CHURCH AT DÜSSELDORF



A CHURCH AT CHARLOTTENBURG



THE OLD TOWN HALL OF Breslau, IN SILESIA



THE MUSEUM OF THE MARK, BERLIN



BONN CATHEDRAL, IN RHENISH PRUSSIA



THE HANSA BRIDGE ACROSS THE RIVER ODER AT STETTIN, IN PRUSSIA



THE KRUPP WORKS AT KIEL, THE GREAT PRUSSIAN SEAPORT



A FINE OLD CASTLE AT MARIENBURG,
IN WEST PRUSSIA



PORTA NIGRA, A GATEWAY BUILT BY THE
ROMANS AT TREVES



THE OLD PROTESTANT CHURCH AND THE SCHILLER MEMORIAL, AT STUTTGART



THE RIVER ELBE AS IT FLOWS THROUGH DRESDEN, IN SAXONY



THE BRANDENBURGER TOR TO THE AVENUE
UNTER DEN LINDEN AT BERLIN



THE FIFTEENTH-CENTURY CASTLE
AT KÖNIGSBERG



THE SPLENDID LAW COURTS AT LEIPZIG



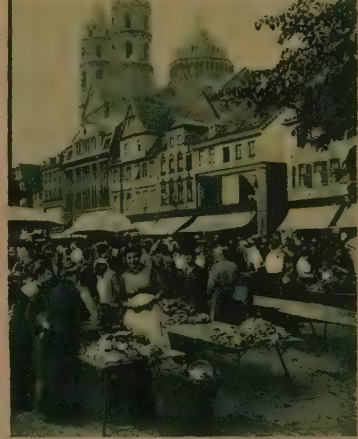
THE MEETING OF THE RHINE AND THE MOSELLE AT COBLENZ



THE CHURCH OF ST. NICHOLAS
AT HAMBURG



THE CATHEDRAL
AT BREMEN



THE MARKET PLACE AT WORMS
ON THE RHINE



AN AVENUE IN THE HOFGARTEN IN DÜSSELDORF

The pictures in these pages are reproduced by courtesy of Messrs. Donald McLeish, E.N.A., and others.



"All Sorts of Minds," as Frans Hals saw them.

ALL SORTS OF MINDS

THERE are, as we have seen, natural differences between various people, which there is no doing-away with or getting-over. People are not alike, and no amount of trial or effort can make them alike, no matter how young we begin. These differences depend on something in the making of the brain, and they simply have to be accepted.

Undoubtedly environment, as we call the total of all our surroundings, has great influence upon any individual. A child brought up in an atmosphere of intelligence, beauty, courtesy and love is likely to differ very much in manners from one who lives principally in the gutter. But environment cannot do everything. There is something that is born in a child with which environment can do little. The gutter brat may have something which the other child has not, and may turn out to be a more useful man.

Two children brought up in the same house and surrounded by the same influences will not be alike. One may have a great fondness for music, while the other may be almost tone-deaf. One may have an aptitude for science, while the other may care more for literature or history, or may not like books at all.

CONTINUED FROM 4068



Parents and teachers often think they can make all children alike. They fail, of course, and often they make the life of the young people wretched and also prevent them from developing as Na-

ture intended them to do. So a scientist is spoiled to make a poor lawyer, or one who might have been an excellent musician becomes an unsuccessful farmer because the parents and teachers decided what occupation the child should follow.

In some minds associations are keen and strong in the direction of numbers. No one can say what it is in the brain that decides this, but the fact remains. Counting, calculating, measuring, reckoning, comparing in terms of length and number and quantity—all these are things which come naturally to a person, and, like other things which come naturally, are done with pleasure.

While some people think in numbers, others like putting things together and taking them to pieces. They like making little toy machines; they want to know how everything works, and can understand a complicated machine by looking at it, when to others it seems a bewildering collection of wheels and levers. They are naturally clever in knowing what

will fit into a certain space, and how to make a toy work in one way if it will not work in another.

These are the practical people to whom engineering probably offers the best careers. In the highest types of this kind of mind it is possible not merely to understand associations which earlier minds have formed, but to form new ones which no one has ever formed before. So that a person of this type does not merely understand the old machines, but can invent new and vastly improved ones.

SOME EXAMPLES OF THE PRACTICAL TYPE OF MIND

Mr. Edison is perhaps the finest example of this type of mind working at practical invention. Such a great worker as Sir Joseph Thomson, the famous Cambridge physicist, offers an instance of this type of mind devoted to scientific experiment. Lord Kelvin was the greatest example of the same type of mind in the nineteenth century, and he divided his time between practical invention and scientific experiment. In each case he was as successful as any man ever was, and he very clearly showed that it is the same type of association which makes the inventor and the scientific experimenter.

In inventing and experimenting, in engineering and in geometry, there is a good deal of seeing with the mind's eye, of making visions in the mind of how things will work, how they will go together, how they may be arranged, and so on.

THE POWER OF MAKING PICTURES IN THE MIND

This power of making pictures in the mind is called *visualizing*, and in all people with this kind of mind visualizing is very powerful, and forms their most natural way of thinking. Not only can they call up in their mind the memory of past *percepts*, so that if they have once seen a machine work they can always call to mind how it worked, but they can make new percepts in their minds and then make them real—and so we get a new invention. The world owes a great deal to such minds as these.

There is another type of visualizing mind. In the autumn some people can call up clearly in their mind's eye the vision of what a landscape looked like in the spring. It is natural for them to notice these things and to make these

comparisons, or associations. When they are talking to people they do not attend particularly to the tones of the voice, and they are perhaps not particularly interested in what is being said, but they are watching and remembering and comparing what other people never notice at all, even in the faces of people they love—the movement of the eyelids, the little tricks of the lips, the poise and movement of the head, and so on. These people are the artists, draftsmen, painters, sculptors, architects of the world.

The architect often sees the whole building in his mind before he has made a line on the paper. The artist may know what he wishes to paint before he has touched a brush. This is not always true, for often the work grows under his hand, and the first vision, or what was seen only dimly at first, is succeeded by something more beautiful.

THE PEOPLE WHO ASSOCIATE IDEAS BY SOUND AND NOT BY SIGHT

Another great type of mind is found in two very different kinds of people, in whom the associations for which their brains are best fitted do not go so much by the eye as by the ear. All the other people, on the whole, may be classed as *visualizers*, and their way of thinking is mostly visualizing, or making visions, old or new, in their minds.

In these other people we are speaking of, the power of visualizing is much less strong, and their chief way of thinking, that is to say of forming associations, is by sound, and not by sight. In such an animal as the dog, associations go chiefly by smell, but in human beings smell has lost its importance, and only sound and sight need be considered. So these people who think and associate mostly by sounds are called *auditives*.

One class of these, the musicians, are deeply interested in sounds just as sounds. They remember tunes and can reproduce them; they can even make new tunes; they can imagine in their minds how one kind of instrument sounds with another, or how certain notes will sound when they are played together, or one after the other. So, as the artists make pictures, these people make music.

PEOPLE WHO CAN IMAGINE SOUNDS THEY CANNOT HEAR

Strange to say, some of these people can remember and imagine sounds they

cannot hear. We are told that some of Beethoven's most beautiful music was written after he had become stone-deaf. He could not hear with his ears any one of the sounds he indicated on paper, but he could hear them in his mind, and hundreds of thousands of people since have gained pleasure from the visions of a deaf man.

The other class of the auditives includes the people whose interests are naturally with words. In them the human mind is at its best. When a person speaks they are not so much interested in the movement of his lips and eyes as the artist is, nor in the tones of his voice as the musician is, but rather in the meaning of what he says. As a musician remembers tones and tunes, and the artist remembers colors and forms, so these people remember words and phrases, and especially the ideas which words and phrases express. This last is particularly important. Words without ideas behind them are only empty sounds.

MOST OF US COPY FROM OTHERS MORE OR LESS

The one type of men can associate lines together to make a picture which is pleasing to the eye; another puts notes together to make a tune which pleases the ear; the third type of mind puts words together to make a thought.

Now, a picture may be very similar to a thousand other pictures which have been painted before; a tune may resemble closely a thousand other tunes which have been composed in previous years. Sentences, ideas, thoughts may recall the writings of others. Consciously or unconsciously they are little more than imitations of what has been done in the past. They please the eye or the ear, but they do not cause a thrill.

This is true of most of the pictures we see, the music we hear, and the books we read. It is to be regretted, but it is true, that few people in the world produce artistic work of high quality. They may have skill and they may show industry, but they lack something, and this fatal lack prevents them from producing masterpieces.

THE SMALL NUMBER OF ORIGINAL MINDS IN THE WORLD

But the small number of great people whom we call original, and who make the progress of the world, cannot only remember and reproduce the old associa-

tions, but can make new and original ones; and so, just as we have great pictures, great statues or great buildings from one type of mind, or great music from another, so from this last type of mind great thoughts will come.

Every now and again there comes into the world a man whose mind combines both varieties of the auditive type. He not only has ideas made by associating words, but he is also concerned with the musical quality of words, and takes pains to put them together so that they have a pleasant rhythm.

This man is a poet, and may at the same time be an orator. The greatest poets are visualizers as well; they can see great pictures in their minds, as Milton saw pictures when he wrote *Paradise Lost*; or they can recall the appearances of nature, as when Wordsworth wrote his poem about the daffodils. Their minds are so rich, and have so many powers of association, that they can compare things other people would not think of comparing.

THE MOST GLORIOUS PRODUCT OF THE HUMAN MIND

All these qualities added together, perfectly blended, and governed by something which is deeper than all associations, and which we can only call the soul, went to make the few sublime poets of the world, who thought and saw, heard and felt and sang, remembered and prophesied, and did all these things so well, and blended them so wonderfully, that their poetry must be called the greatest and most glorious of all the varied products of the human mind.

It is interesting to attempt to classify your playmates. Some of them are certainly "eye-minded"; that is, they understand a thing much better by a picture than by any amount of telling. Others you can say at once are "ear-minded." This means that they can understand better when they hear a thing than when they read of it. Such persons often know their lessons better on the day after than they do on the recitation day. This is because they have heard them explained in class and they remember what they have heard. Probably you will be able to make only these two broad divisions. Generally genius does not show itself plainly in young people, and then, too, young people are not always judges of genius.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 4441.

THE DIVER GOES DOWN TO THE OCEAN BED



The diver's apparatus consists of a helmet secured to a corselet, which is clamped to a waterproof rubber diving dress covering the whole body except the hands, and supplied with air through a flexible tube connected with an air-pump. On his back and chest he carries leaden weights of 40 pounds each.



The diver steps from the ship onto the ladder and descends by a shot-rope—a rope with a heavy weight or shot attached, which has been previously lowered to the bottom. Attached to his waist is a signal line often carrying telephone wires. At the bottom he holds a distance-line attached to the weight.

The Book of Familiar Things



A life-saving dress in which submarine sailors can float to the surface.

DOWN IN THE DEEP, DEEP SEA

IN the caverns deep of the ocean cold, The diver seeks a treasure of gold.

CONTINUED FROM 4063

The bottom of the sea is rich in a harvest of sunken vessels and cargoes, and how can a diver seek this treasure? It is because he wears a sort of armor which keeps out the water and brings him air from above. By the help of this armor he can also do much valuable work in constructing and repairing foundations under water.

The diver's suit of rubber covers his body from feet to neck, but leaves his hands free, as his sleeves end in water-tight cuffs at the wrist. He puts on a heavy helmet made of tinned copper which fastens to the neck of his suit. In this headpiece are windows of half-inch glass secured in brass frames, and in addition to these there may be a window in the top of the helmet. There is a valve attached to a pipe through which comes the air pumped from above. This valve is what is called a non-return and is very important, for if the air-pipe is broken, the valve closes and gives a short time for the diver to realize his danger and act for safety. A second valve in the helmet lets out the air which has been breathed. Electric lamps and tele-

phones are provided, so that not only has the diver the means of seeing around him,

but he can communicate with those above him regarding his operations, and can be communicated with. In order that he may sink down into the water he wears extra weights of lead secured by hooks at the neck.

A recent invention provides him with what is called a ground block. This is a stand or anchor with steps cut in the side upon which he may ride down and up in comfort. Its purpose is to relieve the diver of the weight of his cable, which is attached to the block. When he reaches the bottom he can set up his anchor and fix his cable on a pulley so that he then only has to drag about with him the part between himself and the reel.

The deepest that a man has ever been known to dive is 304 feet, but men seldom go down more than one hundred feet. The deeper down, the greater is the pressure of the air. A man who goes down sixty feet has to breathe air at twice the pressure of the ordinary atmosphere. The result is that the air taken into the blood is forced by the pressure into froth and bubbles. Some of the tissues of the

body give off this air very slowly, so that if a man comes up suddenly, many of these bubbles remain in his blood. This may cause paralysis or death. To guard against this a diver must take a long time in coming up out of the water, resting at different depths so that the bubbles may disappear. A time-table for divers has been made so that they may know how to descend, work and come up again with the greatest safety.

LIGHTENING THE DIVER'S LOAD OF TOOLS

The diver often has to do heavy work in attaching cables and otherwise helping to recover wrecks and cargoes. He needs hammers, drills, scrapers and cutters. He needs some way of carrying these to the bottom of the sea and of storing them while at work. For this a clever inventor has made a submarine air-room, which can be lowered to the sea-bottom from the surface, with which it is connected by air-hose. It carries telephone cables and serves as the diver's base, instead of the ship. There he can keep his tools, and there he can retreat for safety from rapid currents or if anything goes wrong with his suit or connections. His own line runs horizontally from it, instead of vertically from the ship above, and is thus less liable to accident from currents.

So many ships with valuable cargoes were sunk during the World War that divers will be busy for many years seeking to recover the treasure. Already they have recovered practically all of the \$25,000,000 in gold which was in the *Laurentic* when she was torpedoed off Malin Head, Ireland, in January, 1917. The huge liner went down in 120 feet of water and the enormous pressure of water had twisted her steel plates into scrap before the seven years' salvage job was accomplished. It took the divers so long to get out the gold because the currents and the storms forbade work at certain seasons.

HOW A DIVER CAN BE INDEPENDENT OF THE AIR-HOSE

Divers are carried by every man-of-war. If anything happens to the ship below the water-line, the men put on their dress, go down with tools and repair the damage. To one kind of diving suit is attached a cylinder of compressed air, and with this the diver is not encumbered with air-hose and cannot be suffocated by a kink in it caused by a current. To make his supply

hold out for a long period of time he has an air-purification circuit similar to the one described below.

Another invention, for submarine vessels, is a strong helmet and a water-tight jacket. In the jacket pocket is a substance called caustic soda or potash, which, on coming in contact with the sailor's warm breath, gives off oxygen, and so acts that the poisonous carbon dioxid from the man's breath is absorbed. By this means the air inside the helmet and jacket can be breathed again and again. The submarine sailor, in case of accident, puts on this dress and floats to the surface.

A BRAVE DIVER WHO BEAT THE WORLD'S RECORD IN DIVING

In March, 1915, the submarine *F4*, belonging to the United States Navy and carrying a crew of twenty-one men, disappeared in deep water off Honolulu. Divers at once went to the scene of the accident to locate the sunken boat, and thirteen descents were made, every one of which broke a world's record for deep-sea diving. Five were made to a depth of 304 feet, and eight to 275 feet. The former world's record was 274 feet. And for the first time in the history of diving, a telephone device was used successfully in communicating with the men under water. At last the submarine was found—288 feet below the surface—with a hole in her side. The diver who discovered her was under water for two hours, five minutes for the descent, twelve minutes on the bottom and one hour and forty-five minutes in coming up. By a superhuman effort the submarine was raised to the surface by attaching cables to her hull and gradually drawing her into shallower water.

The most unusual work done by a diver was probably that carried out in connection with Winchester Cathedral in England. This ancient cathedral had been built on beech piles sunk in a water-logged peat bog. These piles had to be replaced with cement. To pump the water out would have meant the collapse of the walls, so a diver was employed to do the work in the water.

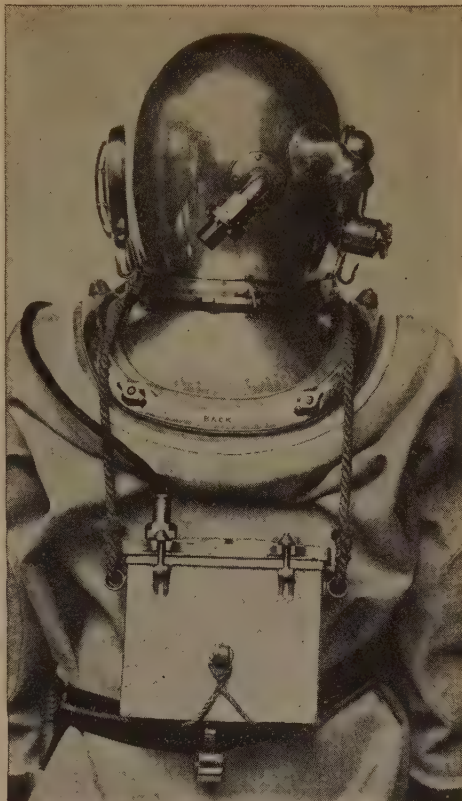
For some kinds of work on the sea or river floor a diving-bell is used. This enables men to do construction work under water without wearing the usual heavy diving suits.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4293.

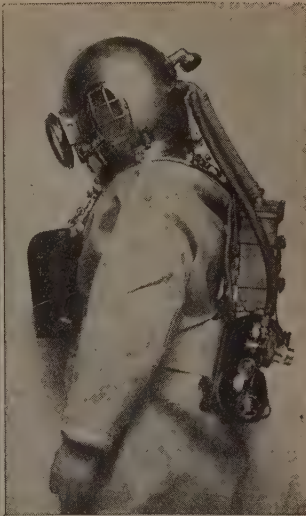
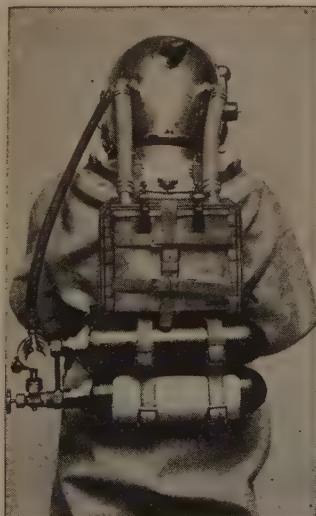
THE DIVER CARRIES HIS OWN AIR



Sometimes the diver carries an electric lamp, which is set in the front weight and can be turned as required.



If the current is supplied from a battery, this is carried in a metal water-tight case carried on the back.



In the self-contained diving apparatus the wearer is supplied with air without the aid of a surface-pump. He breathes a highly compressed mixture of air and oxygen supplied from cylinders which he carries on his back. The carbon dioxide he breathes out is absorbed in caustic soda in a metal chamber, so that the air is rendered fit for breathing again.

A DIVER UNDER A CATHEDRAL



Here a diver is seen connecting up a charge for blowing up an obstruction near a sunken ship.



When Winchester Cathedral began to sink, this diver put in a firm concrete foundation.

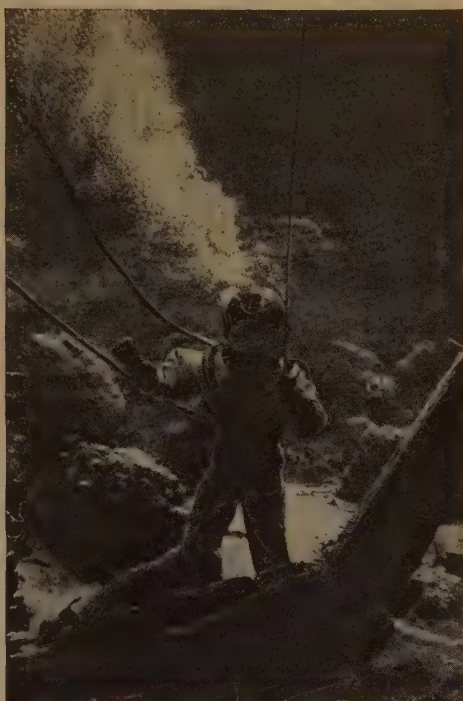


The ruthless destruction of ships during the World War provided much salvage work for divers all over the world. Here we see a diver going down into the hold of SS. Brussels after she was raised.

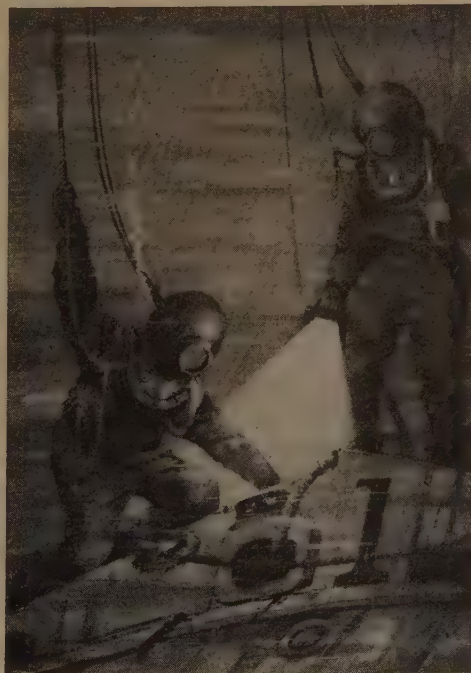
STRANGE SIGHTS SEEN IN THE SEA



One method of raising a sunken vessel is to send divers to patch up the holes. Then the water is pumped out.



This diver, photographed under water with air-bubbles streaming from his helmet, is inspecting an old wreck.



The raising of the once mighty German Fleet at Scapa Flow was a formidable task.

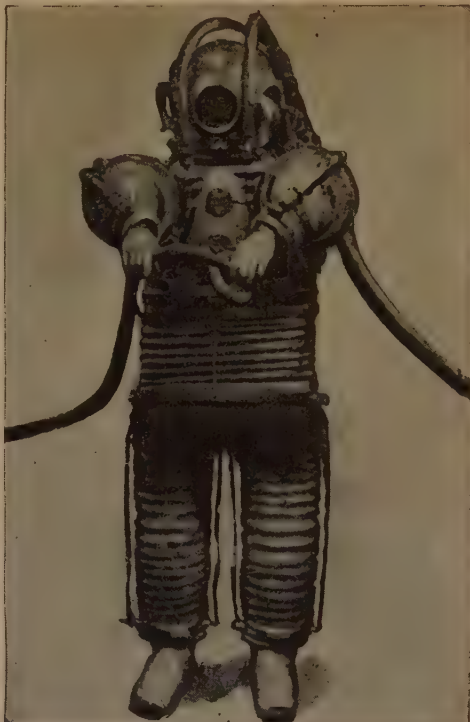


The salving of the millions in the Laurentic was the greatest treasure-hunt of modern times.

THE DIVER AND HIS DRESS



This type of dress is for shallow water and enables a diver to stay for half an hour at a depth of twenty feet.



This dress of stout copper with legs of metallic springs withstands pressure at great depths without air-pressure inside.



Some of these dresses enable a diver to move quickly at depths where the water-pressure is exceptionally great.



This strange garb, the legs, arms and fingers of which are fitted with ingenious joints, is in use at Hamburg.

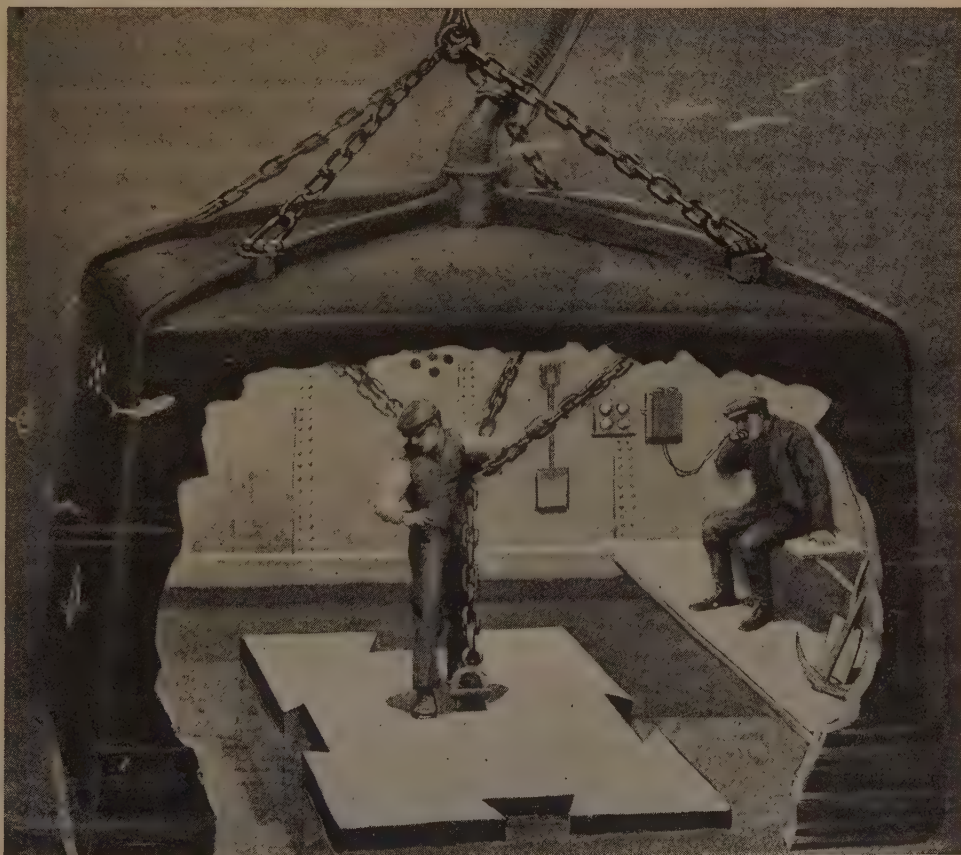
THE WORKMAN'S DIVING-BELL



This monster diving-bell, 18 feet long and over 6 feet high, weighs about 35 tons.



A diving-bell weighing 26 tons is here seen plunging below the surface of Folkestone Harbor.



Here we see the interior of the ordinary diving-bell devised by James Smeaton. It is built of steel plates and is heavy enough to sink readily when the water is blown out by air forced through the pipe in the roof.

FASHIONS FOR THE OCEAN BED



These pictures show the evolution of the diving suit. The suits at the top were made about 1500 and 1798. The next was invented in 1819. From it has been evolved the diving suit of to-day, as seen in the centre. The suit on the right of the middle row is self-contained. The suits below are for deep-sea work.

The Book of STORIES

THE TALES OF LONG AGO

WE turn to this part of our book for our stories, the great stories that we all love to hear. And what wonderful tales they are—tales of fairies, and giants, and trolls, and ogres, and goblins, and castles, and mysteries which no wise man could ever understand. We shall read them here together. We shall meet here friends and enemies. Brave Jack the Giant Killer, beautiful Little Red Riding Hood, sad little Cinderella—all these and a whole host of wonderful people come into this part of our book. Who wrote some of these tales we do not know; but we know that since the world began boys and girls in every country have sat by the fire listening to the tales which never make us tired, and that children will sit listening to them eagerly as long as the world lasts.

CONTINUED FROM 4144

Aladdin and the Wonderful Lamp

ONCE upon a time an African magician came to China to find a wonderful lamp.

In order to get it he had to crawl through a passage leading to a fairy palace beneath the earth. The passage was very small, and anyone who let his dress touch the walls was killed by magic. The magician did not like to risk his own life, so he made friends with a little Chinese boy called Aladdin, and took him to the fairy palace.

"In this place," said the magician, "a treasure is hidden. Do what I tell you and you will become the richest man on earth. Keep this ring on your finger, and do not let your clothes touch anything until you have put out the little lamp that burns in the garden, and placed it in your pocket. Then you can take away as much treasure as you wish."

Down jumped Aladdin into the passage leading to the palace. He found the lamp in a garden where diamonds and pearls and rubies grew upon the trees. Putting it under his vest, he filled his pockets with jewels and returned to the passage.

"Give me the lamp, and then I will help you out," said the magician.

"No," said Aladdin; "help me out and then I will give you the lamp."

This made the magician very angry, and he closed up the opening in the earth, and went back to Africa.

For two days Aladdin wandered about the fairy palace without finding anything to eat or any way of escape. On the third day he happened to rub the ring which the magician had put



on his finger. A spirit then appeared before him, and said:

"I am the slave of the ring. What do you wish me to do?"

"Please take me home," said Aladdin.

In the twinkling of an eye he found himself outside his mother's house. She was a poor widow, and had nothing for him to eat and no money to buy him anything. So he gave her the wonderful lamp, and asked her to sell it and get some bread.

"It is very dirty," she said, giving it a rub.

A spirit then appeared, and said:

"I am the slave of the lamp. What do you wish me to do?"

The widow was too frightened to reply, but Aladdin boldly said:

"Please bring us something nice to eat."

In the twinkling of an eye a table appeared on which there were all kinds of meat and wine, in dishes of gold and goblets of crystal.

Having dined in this manner, Aladdin went out for a walk, just as the daughter of the King was riding by. Princess Badroulboudour, as she was called, was a lovely girl, and Aladdin fell in love with her. He went indoors and rubbed the wonderful lamp, and said to the spirit:

"Please make me rich and build me the finest mansion in the world."

In the twinkling of an eye Aladdin and his mother found themselves in a palace of gold, with six hundred servants to wait upon them and wealth enough to buy a kingdom. They sent forty basins of gold filled with diamonds

and pearls and rubies to the King, and he was so pleased with the gift that he allowed Aladdin to marry Princess Badroulboudour. Aladdin and his wife lived together in peace in the palace of gold until the African magician came again to try to get the wonderful lamp. He found that Aladdin was away hunting, and, disguising himself as a hawker, he walked round the palace shouting:

"New lamps for old! Who will change new lamps for old?"

"I will," said the Princess, running out into the courtyard.

The Princess remembered that there was a little dirty lamp in Aladdin's room, and she brought it out, and, in exchange for a large, bright, new one, gave it to the magician. It was the wonderful lamp! So the magician at once rubbed it, and commanded the spirit to carry the palace of gold and everything in it to the farthest part of Africa.

"Am I dreaming?" said Aladdin, when he came back from hunting. Where his palace had stood there was only a patch of bare ground. Happily, he still wore the ring which the magician had placed on his finger, and he now happened to rub it again.

"What do you wish me to do?" said the slave of the ring.

"Please bring back my wife and my palace," said Aladdin.

"Only the slave of the lamp can do that," replied the spirit.

"Well, take me to Princess Badroulboudour," said Aladdin.

And in the twinkling of an eye he found himself sitting beside his

wife at a dinner-table in his palace in the farthest part of Africa. They were overjoyed to see one another, but before they were able to escape, the magician came upstairs to dine with the Princess. Aladdin quickly crept under the table, and placed a powder in his wife's hand, which she put in her glass of wine.

"Here is an excellent wine," she said to the magician; "just taste it."

The bad magician drank the wine eagerly, and down he dropped, dead.

Aladdin rushed out, found the lamp in the magician's pocket, and rubbed it.

"Oh, please," he said to the spirit, "take the palace back to the place from which it was removed!"

Immediately the palace was taken up from the spot on which it stood in Africa, and set down in China, opposite the palace of the King, who gave them all his riches and made them his heirs.



The magician sat at dinner with the Princess, and the Princess put a powder into her wine. "Here is an excellent wine," she said; "just taste it." The bad magician drank eagerly, and dropped down, dead.

STICKEEN

AN American explorer, John Muir by name, started out one summer from Fort Wrangel to explore the ice-regions of southeastern Alaska. The party included Indian guides and a companion traveler, the Reverend S. H. Young, who, arriving at the last moment, brought with him a little black dog. So little was he and so seeming delicate that Mr. Muir objected to his going, for he knew the rough waters that lay ahead of their canoe and the cold wet camp-sites that would form their lodging-ground. "But," said Mr. Young, "Stickeen is a perfect wonder. He can endure cold and hunger like a bear and swim like a seal. You will find him the most interesting member of our expedition."

So Stickeen was allowed to go along. He was a quaint specimen of a dog—his breed impossible even to guess at. His bunched body and short legs were covered with long silky black hair, and he had a bushy squirrel-like tail carried curling forward. There were brown spots over his eyes, which alone showed his strength of character: they were small and rather deep set, and as you looked into them they seemed as old as the hills and as young and as wild.

Though Stickeen lay lazily curled up in the canoe hour after hour, staring out with dreamy eyes at fiord and mountain, he never missed anything that was going on. When a landing was merely spoken of, he would rouse himself and jump into the water to swim ashore. He followed the camp hunter in his quest after deer—unless Mr. Muir happened to be going out, when Stickeen attached himself to him, enjoying the wildest weather, the snow and icy streams, the rocks and rough places of the glaciers like a true mountaineer. One day the way over a glacier was so crusty that Stickeen's little tracks showed blood-stained till his adopted master noticed and made him moccasins out of a handkerchief. Always he met his troubles with the greatest bravery and independence. He was not an easy dog to know, for he answered no advances and remained so quietly shut up in doggy reserve that his very daring and pluck might have been taken for ignorance of risk. He never played nor

forgot his dignity for a single instant, and seemed sometimes like a small, squat, unshakable desert cactus. Yet Mr. Muir felt the depths within the little sphinx and watched him more and more keenly as the expedition went on.

One night they made camp in a spruce belt on the arm of a fiord across which stretched a large glacier. The explorer awakened early to find a gale blowing from the north and rain flying with the clouds in a grand flood. He had planned to explore the glacier that day, and now eagerly hurried forth, without even a cup of coffee, that he might witness the full grandeur and fury of the storm in its flight over mountain forest and fiord.

The camp was asleep, but Stickeen heard his departure and followed break-fastless through the choking blast. Nor would he be turned back when Mr. Muir stopped and reasoned with him. "Now don't, Stickeen," he said. "What has got into your queer noddle now? This wild day has nothing for you. There is no game abroad, nothing but weather. Go back to camp and keep warm, get a good breakfast with your master, and be sensible for once." But Stickeen persisted, dogged, drenched and blinking, and finally Mr. Muir gave him a piece of bread and they struggled on together.

For a while they lingered in the shelter of the forest beside the eastern wall of the glacier listening to the music of the storm and watching its great pageant of tumbling stream and straining tree. When the wind abated a little, they followed upstream, and at last mounted to the surface of the glacier by means of ax-steps made easy for Stickeen. Now they were on what seemed an endless prairie of ice, gray sky hemming them in, rain descending upon them. For a while they wandered about near the edge; then, as the clouds began to open here and there, and the ice seemed safe, Mr. Muir decided to strike out for the other side of the fiord and the limit of the glacier. They managed the passage safely, near the west side coming out upon a closely crevassed section where it was necessary to make long narrow tacks and doublings along the edges of deep fissures in the ice. The explorer took no chances, but Stickeen came on "unhesitating as the flying clouds."

In dazzling intervals of brightness the limits of their world enlarged: the whole glacier stretched from shore to shore with its encircling mountains clad in cloud as with a garment. At their feet the prairie glittered with a myriad ice-crystals.

They followed a branch of the glacier which flowed away from the main basin into a lake, and then, because the day was far spent and the sky grown dark, started on their return trip across the ice. Soon the low-hanging clouds began to drop their fringes in snowflakes, thick and fast and blurring. Stickeen came close up behind Mr. Muir, and the two pushed on, jumping innumerable crevasses and avoiding impossible places by doubling up and down. Soon the prospect of spending the night on the glacier threatened the travelers, now wet and cold and exposed to a searching wind from the mountains. They pressed on with the utmost speed, but found their way barred by a very wide and straight crevasse that could be crossed in one place only. Mr. Muir deliberated some time before jumping: it was very wide and, in addition, the opposite bank was a foot lower—a condition which would make return, if return were forced, very dangerous.

At length, because of the dangers already behind him, he determined to venture against those that might be ahead, and so jumped and landed well. Stickeen followed, making nothing of it, and they ran eagerly on, hoping that all the troubles were behind. Alas! within a few hundred yards they were stopped by the widest crevasse yet encountered. Tracing it up and down stream in the hope of a way out, Mr. Muir discovered, to his dismay, that he and Stickeen were on an island, with two barely possible ways of escape: one back by the way they had come, the other ahead by a difficult sliver-bridge that crossed the great crevasse where it was widest.

The crevasses in a glacier are formed by strain, as its parts move at different rates, or by unevenness in its bed. They widen gradually, and are often interrupted like the cracks in wood, so that a strip of ice between the two sides may be dragged out and hang like a bridge between the two walls. Weather melts the top of these ice-bridges in the course of time to thin knife-edged blades which in

the middle tend to curve downward like the cables of suspension bridges.

The sliver now facing Mr. Muir was old, and therefore badly weathered and dangerous. The width of the crevasse was here almost fifty feet, and the ends of the sliver were attached to its sides eight or ten feet below the brink, while its centre sloped downward twenty or twenty-five feet. The sheer wall from the glacier to the bridge and up again was a tremendous difficulty. Nevertheless, the explorer overcame it. Using extraordinary care, he cut, one by one, ice-steps and notches for his hands in the ice-walls, and as the wind was high, clung close to the cliff lest his ax should glint. He made a small platform at the end of the bridge, and balancing himself on that, he swung himself astride the sliver—which now for him was all the world. Studiously ignoring the awful depths to right and left of him, he worked cautiously forward inch by inch, every sense alert, his body seeming all eye. Then once again to balance himself and hack and climb and cling! The top was reached.

Now for Stickeen. When Mr. Muir had started his descent to the sliver the small black dog had shown immediate recognition of the danger of the undertaking. He pushed his head past his master's shoulder, looked down and across, scanned the sliver and then looked Mr. Muir in the face with a startled air, and began to mutter and whine, as if saying: "Surely you are not going into that awful place!" He was so human in his fear that unconsciously his master answered him as he might have done a frightened boy. "Hush your fears, my boy," he said; "we will get across safe, though it is not going to be easy. No right way is easy in this rough world. We must risk our lives to save them."

But Stickeen began to cry, and then ran off to find an easier way of escape. When he got back, his master had started and dared not look back, though conscious of his wee friend's howls of despair, which only redoubled as Mr. Muir reached the other side. For a while nothing would induce him to try the ice-sliver, but running back and forth, he moaned and wailed as if in the very bitterness of death. Again and again the explorer bade him come on and fear

nothing. He would hush for a moment, look down again at the bridge, then shout his unshakable conviction that he could never, never come that way. "O-o-oh what a place! No-o-o, I can never go down there!" Gone were the reserve and dignity and calm of the old Stickeen before the shadow of death in this dismal, merciless abyss. Mr. Muir tried in various ways to persuade him: pretended to leave him, finally went to the edge of the crevasse and told him he must go but would return the next day to seek him.

At last, with the courage of despair, Stickeen, hushed and breathless, made the trial. Crouching in the ax-holes and sticking with every hair to the ice, he worked himself down and down to the end of the bridge. Then lifting his little feet with the regularity of a pendulum, and bracing his little body against the wind, he made the crossing. But dogs are bad climbers. How could he make the ascent of the wall? Mr. Muir was leaning down over the brink and considering the possibility of making a rope from his clothes when a little black body hurtled past his ear. Stickeen had carefully noted the position of each notch and hole and made the ascent at a rush!

Then what reaction! "Well done,

well done, little boy! Brave boy!" cried his master, trying to catch and caress him; but Stickeen would not be caught. In exultant joy he flashed and darted hither and thither, screaming and barking, swirling like a leaf, rolling over sideways, till it seemed as if he must die of excitement. When Mr. Muir ran to him to shake him, he flashed off two or three hundred yards; then wheeling, came back in a wild rush and launched himself at his face.

Then work must sober him down, so Mr. Muir ran ahead and called gruffly to him to follow, as they had far to go and it would soon be dark. In the excitement of their deliverance they ran on quickly, meeting and fearing no further serious dangers. At last the cloudy mountains came in sight and the shore was reached. With safety came weakness, and they only tottered on through the forest and across the mountain to camp, to eat and drop off into rest.

After that day Stickeen would take food from no other hand, gave up all his reserve, and surrendered his soul to the master with whom he had conquered the glacier. At night, when all was quiet about the camp-fire, he would lay his head on Mr. Muir's head with a look of devotion as if at last he recognized his god.

ICARUS AND HIS WAXEN WINGS

THE airplane is one of the wonders of the present age, but dreams of flying through the air are as old as early mythology. King Minos of Crete had in his service a skillful workman named Dædalus. Dædalus built the famed labyrinth for King Minos, but soon afterward he lost the royal favor and was thrown into prison. He made his escape, but could not leave the island, as the king had all departing vessels watched.

The workman was doubly anxious to escape, as his young son Icarus was with him. He decided to make wings for himself and his son. After inspecting the wings of many birds he took a quantity of feathers and bound them together in the shape of wings. The larger feathers he tied with thread and the smaller he secured with wax. Icarus watched his father with interest and collected the feathers when the wind blew.

When the work was finished Dædalus

fastened the wings on his shoulders, and by imitating the motions of a bird he found himself poised in the air high above the earth.

His next step was to teach Icarus to use the wings. The boy learned quickly, but he was impatient to fly faster and higher than his father would permit.

All was ready for the flight. Dædalus warned his son not to fly too low, as the damp would clog the feathers, nor too high, as the sun would melt the wax.

Shepherd and plowman watched in astonishment as the pair rose in the air. On they flew, past Samos, Delos and Lebinthus. But Icarus, exulting in his power, soared upward as if to reach the heavens. The blazing sun softened the wax. Down plunged Icarus, to be drowned in the blue Ægean Sea. His body was buried on an island which is called Icaria to this day.

THE DISCONTENTED PENDULUM

AN old Clock, that had stood for fifty years in a farmer's kitchen without giving its owner any cause of complaint, early one summer's morning, before the family was stirring, suddenly stopped. Upon this the Dial-plate (if we may credit the fable) changed countenance with alarm; the Hands made an ineffectual effort to continue their course; the Wheels remained motionless with surprise; the Weights hung speechless. Each member felt disposed to lay the blame on the others.

At length the Dial instituted a formal inquiry into the cause of the stop, when Hands, Wheels, Weights, with one voice protested their innocence. But now a faint tick was heard from the Pendulum, who thus spoke: "I confess myself to be the sole cause of the present stoppage and am willing, for the general satisfaction, to assign my reasons. The truth is, that I am tired of ticking." Upon hearing this, the old Clock became so enraged that it was on the point of striking.

"Lazy Wire!" exclaimed the Dial-plate.

"As to that," replied the Pendulum, "it is vastly easy for you, Mistress Dial, who have always, as everybody knows, set yourself above me—it is vastly easy for you, I say, to accuse other people of laziness—you who have nothing to do all your life but to stare people in the face, and to amuse yourself with watching all that goes on in the kitchen. Think, I beseech you, how you would like to be shut up for life in this dark closet, and wag backward and forward year after year, as I do."

"As to that," said the Dial, "is there not a window in your house on purpose for you to look through?"

"But what of that?" resumed the Pendulum. "Although there is a window, I dare not stop, even for an instant, to look out. Besides, I am really weary of my way of life; and, if you please, I'll tell you how I took this disgust at my employment. This morning I happened to be calculating how many times I should have to tick in the course of only the next twenty-four hours—perhaps some of you above there can tell me the exact sum?"

The Minute-hand, being quick at figures, instantly replied, "Eighty-six thousand four hundred times."

"Exactly so," replied the Pendulum. "Well, I appeal to you all if the thought of this was not enough to fatigue one? And when I began to multiply the strokes of one day by those of months and years, really it is no wonder if I felt discouraged at the prospect; so, after a great deal of reasoning and hesitation, thought I to myself, 'I'll stop.'"

The Dial could scarcely keep its countenance during this harangue; but, resuming its gravity, thus replied: "Dear Mr. Pendulum, I am really astonished that such a useful industrious person as yourself should have been overcome by this suggestion. It is true, you have done a great deal of work in your time. So have we all, and are likely to do; and though this may fatigue us to *think* of, the question is, will it fatigue us to *do*? Would you do me the favor to give about half a dozen strokes, to illustrate my argument?" The Pendulum complied, and ticked six times at its usual pace.

"Now," resumed the Dial; "was that exertion fatiguing to you?"

"Not in the least," replied the Pendulum; "it is not of six strokes that I complain, nor of sixty, but of millions."

"Very good," replied the Dial; "but recollect that, although you may think of a million strokes in an instant, you are required to execute but one; and that, however often you may hereafter have to swing, a moment will always be given you to swing in."

"That consideration staggers me, I confess," said the Pendulum. "Then I hope," added the Dial-plate, "we shall all immediately return to our duty, for the people will lie in bed till noon if we stand idling thus."

Upon this, the Weights, who had never been accused of light conduct, used all their influence in urging him to proceed; when, as with one consent, the Wheels began to turn, the Hands began to move, the Pendulum began to swing, and, to its credit, ticked as loud as ever; while a beam of the rising sun, that streamed through a hole in the kitchen-shutter, shining full upon the Dial-plate, made it brighter up as if nothing had happened.

When the farmer came down to breakfast, he declared, upon looking at the Clock, that his watch had gained a half an hour in the night.

THE STORY OF THE DAYS

SUNDAY MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY

HAVE you ever met Mr. and Mrs. Day? A more useful family you will never meet from one year's end to the other. They are, in fact, the best servants of the human race, and do as much work in their time as anything or anybody on the face of the earth. We must make their acquaintance.

The seven-roomed house in which they live is called The Week, and it stands in Month Street, which is one of the twelve roads running through Year Town in the wonderful country of Time. We

He is the father of the family, and he is known by the name of Sun Day.

"Hello, Mr. Sun Day! How are you? Glad to see you. But everybody's that, eh? There is no other member of your family quite so popular as you are! Come, I hope you are glad to see me, too. I've brought a little friend with me, who wants to know how you got your name, and to hear something of your history. Do you feel like talking for a few moments?"

"How I got my name? Well, that is



Ages ago men worshiped the Sun and called the first day of the week after him.

will enter this house and go through the seven rooms together. Mr. Day lives in one room, Mrs. Day in another, and their five children have each a room to themselves. But they are separated from each other only by walls of Sleep, and they talk to each other through the telephone of Dreams.

Now, this is the first room, occupied by Mr. Day, who does less work than the rest of the family, but who is very far from being idle. He puts on a surplice and holds Church services, and he also has to provide the whole of the human race with amusements and recreations.

a very old story. How I got my bad name isn't nearly so old; and how I am getting my good name is quite a new story. Nevertheless, just to oblige your young friend I'll run the whole three stories into one, and begin with the old one. Far back in the history of the world, my boy, people could see nothing so wonderful, nothing so beautiful, and nothing so useful as the Sun. They had in them what is called the *instinct of worship*—that is to say, they had a feeling that there was something greater, stronger and more glorious than themselves—something that they ought to

fear, reverence and worship. The Sun seemed to these first people the token or sign of that something, and they worshiped it. The Sun, in fact, became the visible expression of God. Now, when the world got wiser, and men and women knew more about the true God, they still kept the old idea of the heathen in their heads, and called the Christian Sabbath—which means the day of rest—Sunday. They no longer worshiped the Sun, but they called the first day of the week after him, and that is how I got my name.

"People loved me then, and I gave rest

understand just yet what that means. Some of them are noisy and wild and foolish on the Sabbath; they have gone to the other extreme. But it will come right soon. People will use me for rest of body and mind in a proper way, and my good name will be restored."

Well, let us pass to the next room and see what Mrs. Day will tell us.

"I've no time to stay to gossip. I'm a busy woman. Everybody knows that I'm the busiest Day in the week. It's coming after Sunday that does it. Ah, my husband is a lazy fellow! The mess I have to clear up after him! I don't



Monday was sacred to the Moon, the wife of the Sun, who walked in the woods.

and pleasure and festivity to hundreds of generations. Well, as time passed on, people began to make me anything but a sun day; they made me a black day. Children were not allowed to play; books and games were put away and locked up in cupboards as something wicked; and all my precious hours were spent in gloom and solemnity.

"Then it was that I got a thoroughly bad name. People said Sunday was the gloomiest day in the week; they ate too much, and sat about yawning and grumbling. Just lately I've reminded them that Jesus, our great Teacher, once said the Sabbath was made for man, not man for the Sabbath. They don't quite

believe in holidays. Let everyone do his work."

"We mustn't interrupt her," said Mr. Day. "Her name of Mon is short for Moon. She is really Moon Day, the day sacred to the wife of the Sun. In ancient times people called the goddess of the moon Diana, and temples were built for her in nearly every quarter of the world. They used to think that Phœbus Apollo, the sun god, drove his flaming chariot across the sky by day, and that Diana drove her silver chariot through the sky by night. They loved Diana because she was gentle and beautiful. Woods were sacred to her because she could be seen walking through them.



Tyr, the god of war, captured the wolf-spirit, and Tuesday is named after him.

Round cakes were made on her feast day, with candles stuck round them. Boys and girls considered Diana their own particular goddess, and loved her very much."

And now we must peep into the room of Mr. and Mrs. Day's eldest son, Master Tues Day. You observe that he has only one hand, and the story of how he lost his other hand is the story of how he came by his name.

The Norsemen had a god of war named Tyr, and when a terrible wolf-spirit named Fenris had to be captured, because he was troubling the whole earth, it was Tyr who undertook the dangerous venture. The spirits of the mountains had made a chain out of the hardest things in the world to find—the footsteps of a cat, the beards of women, the

roots of stones, the breath of fishes, the nerves of bears, and the spittle of birds. This strange chain could not be broken, and with it Fenris was to be bound.

But Fenris would not allow even this soft-looking chain to be put round his neck, and said he would suffer it only if the gods would promise to take it off again, and would send a god to put his hand in the wolf's mouth. Tyr was the only god brave enough to volunteer. He put his hand in the mouth of Fenris, and Fenris was bound; then, in his rage at being captured, he bit off the hand of the god. It is curious that the French name for Tuesday is Mardi—that is the day of Mars, who was also a god of war like the Norseman's Tyr, who gives us Tyr's Day, or Tuesday. The second son



Wednesday is called after Woden, who sent ravens round the world for news.



The more that Thor, the god of Thursday, tried to drain the horn, the more it filled.

of Mr. and Mrs. Day is named after Woden, or Odin, the greatest god of the Scandinavians. Woden lived in a palace built entirely of gold and silver, which was called Valhalla. Two ravens stood on his shoulders, and when he wanted news of the world he sent these ravens to fly round the earth and bring him intelligence of everything they saw and heard.

Round about him stood maidens with helmets, and spears and shields, and these maidens, named Valkyries, were sent down to earth to bring the souls of heroes slain in battle to feast with Woden in Valhalla. While they feasted, Woden listened to their stories and drank mead. He never ate anything himself. Our friend Wednes Day is a good fellow, and everybody likes him. He lives in

the middle of the house, and seems to be saying all day long:

"Work away; work away! Sunday will soon be here again."

And now here we are at the fifth room, occupied by Master Thurs Day. Isn't he a big, strong, vigorous fellow? If ever you have a hard bit of work to do, start at it on Thursday—the day of strength and power. Thurs Day gets his name from Thor, the strongest of all the Scandinavian gods. Thor had a hammer which no man could lift, a pair of iron gloves, and a belt which, when it was fastened round him, doubled his great strength. But once the mighty hammer was lost, and a giant named Thrym hid it. He said he would give it up only if the goddess Freya would marry him.



Friday was named after Frigga, the wife of Odin and goddess of marriages.

Thor disguised himself in Freya's dress and went to visit the giant. Imagine the giant's surprise when he saw the lovely goddess eat a whole ox and eight salmon at a single sitting! The companion of Thor explained that the long journey had made the goddess hungry. Thor received the hammer, and slew Thrym and all the other giants. But there were some things beyond even his power. He tried to lift a cat, and was surprised to find that he was unable to; the reason was that the

Her name means "woman" or "wife," and she represented the earth. For her the sixth day of the week was named. Friday is a very sacred day, although some superstitious people think it is a day of ill-luck, and sailors are reluctant to set forth on a voyage on Friday.

And now we come to the half-holiday room, where Satur Day lives, who gets his name from the Roman god Saturn. The Romans used to feast and drink and make merry in honor of Saturn. Saturn



Saturday is the day of Saturn, in whose honor the Romans used to feast and drink.

cat was really the serpent Midgard, who holds the earth in its embrace. He then tried to drain a horn dry, but he found that the more he drank the more it filled; this was because the other end of the horn was fastened to the sea, and, as we all know, the sea could never be drained.

The sixth room belongs to Mr. and Mrs. Day's only daughter, Fri Day, named after the goddess Frigga, who is not the same as Freya, goddess of love and sister of Frey, although the two are often confused with each other. Frigga, the wife of Odin, was supreme among goddesses.

was a god who ate his own children and behaved altogether in a very barbarous fashion. We won't speak too much about him, but think of what his day has come to mean. For us Saturday is one of the pleasantest days in the week. The week's work is done. In fact, it is almost a national half-holiday, and people go in crowds to see a ball game, or pour out of the cities in thousands to see and enjoy the fields and woods, or, if they happen to be near the sea, to wander by the shore.

THE NEXT STORIES ARE ON PAGE 4301.

THE MOST FASCINATING QUEEN IN HISTORY



This is a picture of Mary Stuart, Queen of Scots, who is said to have been so beautiful and so wholly charming that no man could long resist her fascination. She was crowned when scarcely a year old and married Francis II, the young dauphin of France, when she was fifteen. Upon the death of the dauphin she became the wife of her cousin, Lord Darnley. Despite her beauty and winning ways the young queen's reign upon the throne of Scotland was full of troubles, which finally ended in her tragic death at the hands of Queen Elizabeth of England. In the background of the picture we see Holyrood Castle.



The English carrying the sacred standard at Northallerton, where the Scots were defeated.

KINGS AND QUEENS OF SCOTLAND

KINGS and queens are like figures on a stage to most of us. We look at them from a distance. They are surrounded with ceremony and secrecy so that they seem to be not quite like ordinary people. That is why it is difficult to know what a living king or queen is really like. But with dead-and-gone monarchs all that ceremony and secrecy is swept away. We see old kings and queens as chief characters against a background of the times they lived in. That is what makes the former rulers of Scotland interesting.

It is only since the death of Queen Elizabeth that Scotland and England have had the same ruler. Before that Scotland had a throne of its own; and on that throne sat many gallant men and fair women. It was no easy task to govern the wild and mountainous northern country, for the people were divided into groups called clans. There have never been prouder men than the chiefs of these clans who led their followers to war to avenge the slightest wrong. Fighting was an everyday occurrence in the Scottish Highlands. The king or queen who sat on the Scottish throne had to depend on the support of some strong clans. Powerful chiefs could make or unmake

CONTINUED FROM 4049



a ruler, and did so. Indeed, a description of one chief, written hundreds of years ago, ended with the words: "He holds of the crown; he can bring out five hundred men." If a chief felt himself insulted by the king he would rise. His

kilted warriors, armed with bows and the great swords called "claymores," would swarm from their mountains and glens at the first notes of the thrilling "pibroch," the war music of the bagpipes. Those were stirring days. And it is that warlike background that is behind the whole line of Scottish kings and queens.

We do not know the names of the very early kings in Scotland. The Scottish students have an amusing song:

Fairshon had a son
Who married Noah's daughter,
And nearly spoiled the flood
By drinking all the water.

Fairshon means Macpherson, and the Macpherson clan might claim that they could trace their descent back to this Fairshon of the song. If the song were true, probably Fairshon was the first Scottish king. But the truth of that is lost in the mists of the past.

All we can be sure of is that in 860 A.D. the Scots and the Picts were brought under Kenneth MacAlpine, a

Scot. The united kingdoms were called Scot-land and included all the country north of the Firth of Forth. Afterward the land southward to the river Tweed was captured from the English and became part of Scotland. Not much is known of any of the kings who succeeded MacAlpine until we came to Duncan. Duncan ruled in Scotland about the same time that King Canute ruled in England.

Every boy and girl will remember Duncan's name. Who can forget in Shake-

to be had by those who could take them by force. Macbeth fought Duncan and killed him, but it was in a fair fight. Little good did Macbeth gain from his success. For he was slain in battle a few years later, and Duncan's son Malcolm came to the throne.

Scottish people have a great liking for nicknames, and Malcolm was called Canmore, which means "big head." From him all the kings of Scotland, and of England, too, after King Stephen, were



Margaret arriving in Scotland in 1066.



The good deeds of King David I.

peare's Macbeth the three wicked witches who sprang out of the ground and said: "All hail, Macbeth, thou shalt be king hereafter!" In the play, Macbeth, then Earl of Moray, murdered Duncan to get the crown. But Shakespeare did not stick closely to the truth. He was writing a good play, not an accurate history. What really happened was that Lady Macbeth had as much right to the throne of Scotland as Duncan.

In those turbulent days thrones were

descended, because King Henry I of England married Malcolm Canmore's daughter. Now, this Malcolm with the big head wedded Margaret, the sister of Edgar the Atheling, who was the true heir of Edward the Confessor. That is how the blood of Alfred the Great comes down to the present King George V. Malcolm Big-head was a warrior, and he was not pleased that William the Norman had seized the crown of England. For he would have liked to see his own wife's

THE KING WHO SET SCOTLAND FREE



Robert the Bruce is, after Wallace, the greatest national hero of Scotland, the man who delivered his country from the English yoke. But at first the fortunes of war went against him. After being crowned at Scone, with a small coronet, because the Scottish crown had been carried off to England by Edward I, Bruce was defeated at Methven. He had to flee, and his wife and daughter were captured by the English.



Bruce drove the English out of Scotland and then set himself to build up his kingdom, so that he won the name of "the good King Robert." But the hardships of early years brought on a painful disease, from which he died in 1320. His last public act was to confer a charter upon Edinburgh.

The lower pictures on this page and on 4211, and those on pages 4206 and 4209, are reproduced, by permission, from the frescoes by William Eole, R.S.A., in the Scottish National Portrait Gallery, Edinburgh; the upper picture on page 4211 is by J. Faed, R.S.A.

brother, Edgar, on the English throne. He fought against both William the Conqueror and William Rufus. In one of these battles he was slain. Malcolm was a wise and brave king. He had great love and reverence for his learned wife Margaret, who was held to be a saint. Malcolm's son Edgar became king, and then another son, Alexander I, and then a third, King David I. All these three ruled wisely. But of them David was the most famous, for he made his kingdom strong. He was a pious man, who built many beautiful churches and gave much land to the Church. Some people said he was a saint like his mother Margaret.

One of his descendants said that he had been "a sore saint for the crown," since he had made the kings of Scotland poor that he might make the Church rich. King David was defeated in a great battle in England at a place called Northallerton. This was called the Battle of the Standard, because the English fought under a standard which was counted sacred. David fought as an English baron defending his liege-queen Matilda against Stephen, who had usurped the throne. Although he was defeated and had to make peace with Stephen, he got nearly as much for Scotland as if he had won.

After David, came a king who was called William the Lion, partly for his courage and partly because he bore on his shield a lion rampant—that is, a lion standing as shown on page 4205. Ever since, the lion rampant has been in the Royal Arms of Scotland. Now we see it in one quarter of the Royal Standard of the United Kingdom.

William made war on the English king, too. But one misty day when he was riding with a small party of knights he met a very much larger English party. The Scots charged the English. After a hard fight William and all his followers were killed or were forced to give in and were taken prisoners.

HOW RICHARD THE LION-HEARTED FREED WILLIAM THE LION

King Henry II of England would not set brave William the Lion free till he had agreed that he would do homage for Scotland itself as well as for the earldoms in England. So for a time Scotland was subject to England. Fifteen years later Richard the Lion-hearted put an end to the agreement. After that, just as before, the Scots kings did not pay homage.

For a hundred years after Richard restored the independence of Scotland there was peace between the two countries. There is nothing more that need be told about William the Lion. And of his son Alexander II it need only be said that he was a wise man and a strong ruler.

After Alexander II came Alexander III. He was only eight years old when he began to reign, and he ruled for nearly forty years. In those days Scotland prospered, and the king was greatly loved and honored. Boys and girls who have studied Latin may have seen the words: "Nemo me impune lacessit." This means: "No one can hurt me and get away scot free." King Haakon of Norway claimed that he was lord of the islands round Scotland and of some part of the mainland, and he led a great force of soldiers to back his claim.

HOW THE THISTLE SAVED SCOTLAND AND WAS MADE THE NATIONAL EMBLEM

King Alexander met the Norwegian king by the seashore at a place called Largs. He overthrew Haakon utterly, so that the Norwegian had to give up all his claims. Thenceforth the islands owned the king of Scots for their sovereign. And the story runs that it was at this time that the Scots took the thistle with its prickly leaves for their national emblem. The Norsemen tried to make a night attack on the Scots army, but one of them, being barefoot, trod on a thistle and cried out. The Scots took alarm and stood to their arms, and the Norsemen were driven into the sea.

Alexander III's heir was his little grandchild Margaret, the daughter of Erik, king of Norway. This little girl, who was called the Maid of Norway, set sail for Scotland that she might be crowned queen. She came no farther than the islands of Orkney, in the far north, where she was taken ashore to die of a serious illness. Then came trouble. Many barons came forward to say that one or another was now the heir to the Scottish throne. But King Edward I of England made himself master of Scotland. The gallant Sir William Wallace fought to free Scotland from the English yoke, but he was captured by the English and killed. His story can be read in *Scottish Chiefs*, a thrilling and inspiring book by Jane Porter, and that story will explain why Wallace has always been the popular hero of Scottish history.

JAMES III PRESENTED TO THE NOBLES



When James II was killed at Roxburgh, the Scottish nobles lost heart, but James's widow took the little king, James III, to Roxburgh, and so inspired the nobles that they rose and defeated the English.

**THE BRAVE KING ROBERT WHO FEARED
NO MAN AND HELPED THE WEAK**

In the train of Wallace was a young man who was to free his country, be crowned king of Scotland and win a name that will never die. That man was Robert Bruce. Bruce, who was a nobleman by birth, took up the cause for which Wallace had died. To his banner flocked loyal Scots who hated the English rule. Gallant was the warfare he carried on against the enemy. But there was one dark chapter which cast a gloom over his whole life. He was in a church in the city of Dumfries when Red Comyn, one of the great barons, and he fell into a quarrel. Bruce fought Comyn and slew him before the altar. For that wild deed his conscience would never let him rest. All his life afterward he hoped to go on a crusade to Jerusalem to take the load of guilt off his soul. Fighting in Scotland kept him too busy to make the journey. Sometimes he defeated the armies under Edward, and sometimes he had to take to the protection of the rugged mountains. The story of Bruce and the spider is known to everyone, but it can be read again on page 552*r*. Bruce did learn the lesson of perseverance in spite of defeat, and he kept hammering the English. Many a fine tale is told of his bravery and magnificent strength. At one time three foemen set upon him, but he slew them all. At another time single-handed he guarded the passage of a ford against a band of mounted men. It is no wonder that he became the pride of Scotland and that Highlanders and Lowlanders were willing to follow him to the death.

The moment came when the fate of Scotland would be decided. Bruce had won back fortress after fortress and town after town from the English, until Stirling alone was left in their hands. King Edward of England gathered all his barons and a mighty army to save Stirling. The two hosts were drawn up by Bannockburn. The English were ready to fight for conquest. The Scots fought for liberty and their homes. With Bruce was Black Douglas, his close friend and a daring warrior. Douglas had harried the English border-side until his name became so feared that mothers sang to their frightened children:

"Hush ye, hush ye, little pet ye,
The Black Douglas shall not get thee!"

Before the battle Bruce called together his leaders and inspired them to their highest effort. Hundreds of years afterward Robert Burns put those words into a poem which every Scotsman knows by heart.

Scots, wha hae wi' Wallace bled;
Scots, wham Bruce has aften led,
Welcome to your gory bed,
Or to victory!

Bruce knew that he was leading his men to victory or death. It was a grand battle for the Scots, and it was won by spear, ax and claymore. The war-pipes shrilled in triumph as the English forces were put to rout. King Edward fled for his life and was lucky to escape back into his own kingdom. Bruce was crowned king at Scone. For fifteen years he ruled wisely and well. When he was dying he asked the Black Douglas to do a last favor for him. When he died he wanted his heart cut out of his body to be taken to the Holy Sepulchre in Jerusalem. In this way he thought his spirit might have rest from the memory of that wild deed of his early days.

**HOW BRUCE'S HEART SET OUT FOR THE
HOLY LAND BUT WAS BROUGHT BACK**

When Lord James Douglas came to Spain, on his way to the Holy Land, he found the Christians there hard pressed by the Saracens. He drew his sword on their behalf. In a great battle, when it seemed that the Saracens would gain the day unless they were stayed by some deed of desperate valor, Douglas drew forth the Bruce's heart. Crying, "Go thou before, as always, and Douglas follows!" he hurled the casket into the forces of Saracens. With his great sword he drove his way through the pagans till he reached that noble relic and there was slain. By that charge the Saracens were routed. A knight named Sir Simon Locard, called Lockhart ("Lock-heart") ever after, found the dead Douglas and the Bruce's heart. He bore the casket home, deeming that the dead Bruce had now done full service in the war against the infidels. The heart was buried under the high altar in Melrose Abbey. To this day, as its highest honor, the coat of arms of the Douglasses bears a bleeding heart.

Of David II, the son of King Robert, we need not tell. After him came his sister's son Robert, the High Steward of Scotland. With him began the line of the Stewart kings, whose name began to

BEFORE AND AFTER FLODDEN FIELD



No more disastrous event is found in Scottish history than Flodden Field, where James IV was defeated and slain with the flower of his army. Before the king set out, an old man suddenly appeared in his presence and warned him against war with England. But the king took no notice.



Flodden was a terrible battle for both sides, for the victory of the English was nearly a defeat and their losses were heavy. When the news of disaster reached the Scottish capital, as shown in this picture, it caused dismay, but the authorities calmed the people and prepared to resist invasion.

be spelled Stuart two hundred years afterward. After Robert II came Robert III, who changed his name from John to Robert because King John of England, King John Baliol of Scotland and King John of France had been so luckless.

THE KING WHO CHANGED HIS NAME FOR LUCK BUT DIED OF A BROKEN HEART

Yet he was none the better for that. His eldest son was murdered, and his second son, James, was caught on a voyage to France and held a prisoner by King Henry IV of England. This blow broke poor King Robert's heart, so that he died soon after. The young prince was the first of six kings of Scotland, each of whom was named James. Of these six, two were murdered and two were killed in battle. The name seemed to bring ill-luck to those who bore it.

King James I of Scotland was held a prisoner in England for eighteen years after he became king in name. One remarkable thing about him is that he is one of the very few kings who have been poets. James was in England about the time of the great English poet Chaucer. Having fallen in love with a lady whom he saw through his prison window, he wrote a beautiful poem called the *Kinges Quhair*, which means the "king's book."

THE GOOD POET-KING WHO LOST HIS LIFE THROUGH DOING HIS DUTY

He was a good poet and a good king, too, as he proved when he was at last set free and allowed to go back to Scotland. For there he found the country in great disorder and full of lawlessness. Ruling with a strong hand, he protected the weak and curbed the nobles. To do this he needed money, and the Scots kings were poor. He had to tax the people, and there were many of them, as well as of the nobles, who were ill-content with his rule. And so it came about that Sir Robert Craham plotted against him and murdered him, as we read on page 4579 in the story of the Golden Deed of Katharine Douglas, whom men called Kate Barlass.

James II, called "fiery-face," was killed by the bursting of a cannon when he was only twenty-nine. James III, even after he grew up, was but a feeble ruler. The barons rebelled, and routed the king's forces. And James, flying from the battle, was thrown from his horse and murdered.

THE BRAVE SCOTTISH KING WHO WAS SLAIN ON FLODDEN FIELD

James IV, who came to the throne, was just old enough to act without a regent. He was brave, handsome and very popular. He took care of his kingdom, and in particular tried to make Scotland powerful by sea. Yet he brought woe upon Scotland at the end. For when King Henry VIII went to war with France, King James led an army into England because of an old friendship between French and Scots.

The English and Scottish forces met on Flodden Field. No one knows what happened to James before the battle, but he did not seem to be himself. Sir Walter Scott, in *Marmion*, tells about the beginning of the greatest tragedy in Scottish history.

And why stands Scotland idly now,
Dark Flodden! on thy airy brow,
Since England gains the pass the while,
And struggles through the deep defile?
What checks the fiery soul of James?
Why sits that champion of the dames
Inactive on his steed,
And sees, between him and his land,
Between him and Tweed's southern strand,
His host Lord Surrey lead?
What 'vails the vain knight-errant's brand?—
O, Douglas, for thy leading wand!
Fierce Randolph, for thy speed!
O for one hour of Wallace wight
Or well-skilled Bruce, to rule the fight,
And cry,—“Saint Andrew and our right!”
Another sight had seen that morn,
From Fate's dark book a leaf been torn,
And Flodden had been Bannock-bourne!—
The precious hour has passed in vain,
And England's host has gained the plain;
Wheeling their march, and circling still,
Around the base of Flodden hill.

Scott ends his description of the battle with a lament for the defeat. A wail for the dead has gone up from all the glens of Caledonia (another name for Scotland). But in the words of the poet:

Tradition, legend, tune, and song,
Shall many an age that wail prolong:
Still from the sire the son shall hear
Of the stern strife, and carnage drear,
Of Flodden's fatal field,
Where shivered was fair Scotland's spear
And broken was her shield!

James himself was slain, and with him the best of the Scottish nobility. A very famous song of lamentation, *The Flowers of the Forest*, is still sung in Scotland in memory of that terrible day.

The next king, James V, was a baby

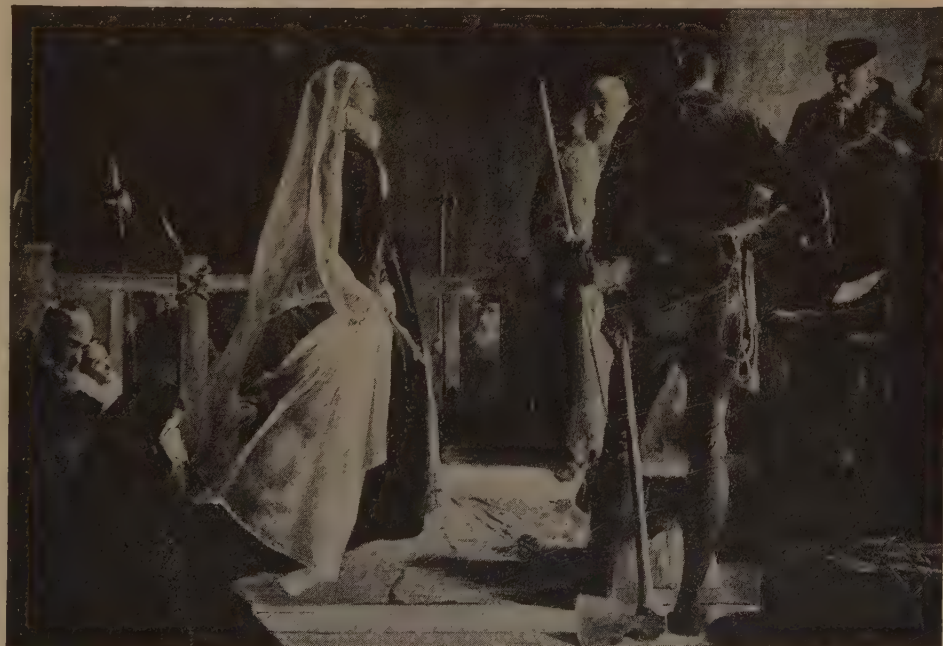
"THE LOVELY, HAPLESS SCOTTISH QUEEN"



The Scottish nobles compelling Mary Queen of Scots to abdicate the throne.



Mary Queen of Scots escaping from her imprisonment at Loch Leven Castle.



Mary mounting the scaffold for execution after eighteen years in prison.

when the crown came to him. There was constant trouble with the English as soon as James was old enough to rule for himself. At last he prepared an army to make a raid into England. But it was put utterly to rout at Solway Moss.

His daughter became very famous as Mary Queen of Scots. While she was still a tiny girl she was sent away to France that she might be out of reach of the English. She was brought up in the court of France, and was wedded to the king's eldest son, and became queen of France as well as of Scotland. In the meanwhile her mother, Mary of Lorraine, ruled Scotland. But Mary was queen of France for only one year, because her husband died. She was a widow at the age of eighteen, and an orphan, too, for in that year her mother died also. Then the young queen resolved to return to Scotland.

THE BEAUTIFUL YOUNG QUEEN OF SCOTS AND HER TRAGIC STORY

But Mary Queen of Scots was a very beautiful and fascinating young woman, who had been brought up at the French court, which was exceedingly gay. There she had been taught the Roman Catholic religion. She soon found herself giving offense to John Knox and others who would have forbidden the practice of her religion altogether. Then she was unwise enough to marry her cousin, Lord Darnley, a handsome young man whom she very soon found to be both bad and foolish. Because she put much trust in David Rizzio, who was her secretary, Darnley had ill thoughts of her. He, with several nobles, made a plot to slay Rizzio, and they murdered him before the queen's eyes.

After that she had a great hatred for her husband. When he, too, was murdered, a year later, she wedded the Earl of Bothwell. Many people believed Bothwell to have done the deed and that the murder had been done with Mary's aid and good-will. Many of the nobles rose against her and took her prisoner. They shut her up in the Castle of Loch Leven, and made her give up the crown to her baby son, who became James VI. She escaped from Loch Leven, and her friends gathered to her. But the other party came against her and routed her forces at Langside, near Glasgow. She fled across the Solway into England to Queen Elizabeth.

WHY ELIZABETH WAS AFRAID OF MARY AND HAD HER BEHEADED

Now, Elizabeth was the last living child of Henry VIII, and if she died Queen Mary would be the heir to the English throne. The Roman Catholics thought that Elizabeth herself ought not to be queen, and some of them were anxious to make Mary queen in her stead. Therefore Elizabeth would not let her go free. Yet, even if Mary had had a share in murdering Darnley, which had not been proved, Elizabeth had no right to put her to death, for she was not a subject of the English queen. For eighteen years Elizabeth kept Queen Mary a prisoner. There were many plots, in which the king of Spain had a hand, to destroy Elizabeth and set Mary on the throne; but we have no proof that Mary herself shared in them. But at last a young man named Babington made a plot, and a letter was shown which Mary was said to have written approving of the plot. The queen of Scots was condemned to death for plotting treason against the queen of England. She was beheaded at the Castle of Fotheringay.

It is a long time, over three hundred years, since beautiful Mary met such a sorry fate. But songs and stories have kept her memory green in Scottish hearts. Her faults are forgotten and she is remembered only for her beauty and charm. A hundred years ago or so there lived a little wonder child in Scotland, Marjorie Fleming, who was dearly loved by Sir Walter Scott. "Pet Marjorie," as she was called, before she was eight years old wrote a verse which shows how Scottish children feel about Mary Queen of Scots:

Queen Mary was much loved by all,
Both by the great and by the small,
But hark! her soul to heaven doth rise!
And I suppose she has gained a prize—
For I do think she would not go
Into the *awful* place below;
There is a thing that I must tell,
Elizabeth went to fire and hell;
He who would teach her to be civil,
It must be her great friend the devil!

When Mary had been made to give up the crown, her son, who was only one year old, was proclaimed king as James VI. When he became James I of England he went to live in that country, and we read of his doings from that time on page 1973.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4353.



Graceful and spirited figures from the Parthenon frieze, in lines of rhythmical beauty.

THE GOLDEN YEARS OF GREECE

THE three greatest sculptors of Greece were Polyclitus, Myron and Phidias (or Pheidias). Most of their original statuary has been lost; some fragments remain, and certain copies. You may ask, seeing that the mass of this ancient work has disappeared, how it is that we can so confidently declare that these sculptors share the supreme genius of the world.



The answer to that is Pausanias and a few others, but chiefly Pausanias. He lived in the second century after Christ, was a great traveler, and wrote many books, including a description of Greece. He wrote fully and carefully about the buildings and sculpture, and his history is invaluable. Other men more gifted as writers had composed treatises and essays on Greek art, but much of their work is lost. That of Pausanias was mercifully preserved.

Suppose that one of our great cities—London or Paris or New York—was to be overthrown and other cities built up on the ruins. Then, suppose that two thousand years after the time of destruction the new generations, to whom the city had been but a name and a legend, should be able to realize what it had looked like by reading a description written in the days of its glory.

This is the service men like Pau-

sanias and Pliny have rendered: they make an old civilization clear to the eyes of a new and different people. We have identified from their descriptions many fragments excavated, and have found in other lands many copies of original sculpture which they mentioned. But a number of the statues by Greece's greatest men we have to take on trust, or accept through the medium of marble copies made at a much later period.

Such lost treasures are the Hera—a colossal statue in ivory and gold by Polyclitus—described by Pausanias. Of it no trace remains, and the famous athletes by the same sculptor are represented only by copies.

Polyclitus worked during the latter half of the fifth century. He followed Agelados, the ancient sculptor of Argos, in whose studio, or workshop, Polyclitus, Myron and Phidias are said to have passed their apprentice years, and when the veteran sculptor died, Polyclitus succeeded him as head of the Argive school.

We must remember that it was the blending of these Doric schools of the Peloponnesus, such as Argos, Sicyon and Olympia, with those of the Ionian schools, whose head was Athens, that produced the ultimate greatness of Greek art.

The sculpture of Argos, Sicyon and Olympia was naturally affected by the daily life of the nation. And the interests of men centred in the Olympian games held every fourth year.

To the Dorians the perfect young man was the one whose body was so admirably built and disciplined that he could make it endure the most arduous physical tests. Running, boxing, wrestling, throwing the javelin and the quoit or discus—these were part of the exercises practiced continually, and publicly performed at the great festivals by the youth and young manhood of Greece. Oh, the glories of triumph, the cries and excitement of the huge crowds, when the winner came up to the judge to receive the victor's wreath!

THE VICTOR IN THE GAMES WHOSE STATUE WAS SET UP AT OLYMPIA

All this is but faint and dim to us, like songs in a fairy tale, but as the life of old Greece becomes plainer through her art we must surely admire the aspect of it; for there are few spectacles finer than that of a young man denying himself many things in order that his body may be kept in complete mastery.

The victor's wreath—looked upon as the final glory by many a boy of seven who was yearning for his manhood—was not the athlete's only reward. For certain games a statue of the winner was set up at Olympia. It is interesting to note that only after a winner had been successful three times was the statue made to resemble him—to become a portrait. Otherwise, it was just a type of an athletic youth labeled with the name and honor of the victorious one.

The effect of this "sport" on the sculpture of the day, in Olympia, Argos and Sicyon particularly, was tremendous. There was always a place in every town where youths congregated to practice for the festival, and there sculptors could watch the beautiful naked bodies to their heart's content. And seeing thus continually the human form, perfectly developed, in glorious play, completely subject to the will, the sculptor could hardly help reflecting this spirit and poetry of movement in his work.

It was to be expected, also, that athletic vigor rather than reposeful beauty, a certain harshness at times, a crudeness, should mark this work of the Doric schools of the Peloponnesus, in contrast to the Attic school. The whole spirit of Athens

was different. The Athenians were a finer, subtler people, more ease-loving, perhaps. Certainly they were given more to mental and imaginative than to physical exercises.

THE ARTISTS AND THE STORY-TELLERS IN THE STREETS OF OLD ATHENS

In the old city of Athens artists could see, as they passed through the bright streets above the windy sea, philosophers talking together, and could stop and share their converse. They could pass into the hall and hear statesmen speaking of the eternal principles of liberty and of ideals, could hear Pericles himself making an oration.

These artists could see in another place a story-teller reciting one of the books of the *Iliad*, surrounded by men, women and children who wept and scarcely breathed as they heard of Achilles going forth to slay Hector, of the long chase round the walls of Troy, and the fight, and the death of the Trojan hero:

"Thrice round Priam's city circled those twain with flying feet, and all the gods were gazing on them.

"But when the fourth time they reached the springs; then the father of the gods hung his golden balances, and set therein two lots of dreary death, one of Achilles, one of Hector, and held by the midst and poised. Then Hector's fated day sank down, and fell to the house of Death."

THE SCULPTORS WHO TRIED TO SHOW THE MIND BEHIND THE FACE

While the story-teller was reciting Homer's lines, in the distance, up on the Acropolis, could be heard the sound of workmen's labor, for the snowy marble mass of the Parthenon was rising on the ruins the Persians had left—but we shall be thinking of that later.

In glorious Athens, then, sculpture was of another kind from that made by the artists of the other states; it found its height in the grand and spiritual qualities of Phidias. It was concerned more with thought than with action. The Athenian sculptors struggled to express the beauty of thought behind facial features, strove to render in marble those changes of expression that betray happiness and sorrow, pleasure or discontent; whereas to the Doric sculptors, if a face was perfect in proportion, that sufficed. And we see how these forces, the spiritual and the physical, when they were blended, made the miracle of Greece in her golden years.

TREASURES FROM THE ACROPOLIS



Greek and Centaur fighting on a metope of the Parthenon.



A Caryatid from the Erechtheum.



A Greek and Centaur group on a metope of the Parthenon.



A horseman from the Parthenon frieze, now in the Elgin Room of the British Museum.

POLYCLITUS AND HIS WONDERFUL FIGURE OF THE IDEAL ATHLETE

The most famous work of Polyclitus of Argos was sculpture of an athletic type. He may be said to have founded the athletic sculpture which became so marked a feature in the art of the Peloponnesus. Two statues in bronze earned for Polyclitus a wide renown. The more famous of the two, called Doryphorus, became known as the Canon, or Rule. It was a man's figure supposed to be of such perfect proportions that the world might refer to it as a standard. And many an argument in an Argive studio concerning this or that work by a rising genius, whose youthfulness made him conceited, may have been silenced by "Compare it with the Canon."

The Doryphorus is not a portrait of any given person: it is the ideal athlete. It shows a man holding a spear sloping against his shoulder, and the original statue of Polyclitus was in bronze. This was destroyed long ago, and we are indebted to copies which, however fine, can only incompletely represent the original. Moreover, a bronze statue reproduced in marble is sure to suffer. Many of the copies that remain of Polyclitus' work were made in Roman times; the best-known copy of the Doryphorus, now in the Naples Museum, was found at Herculaneum.

THE VICTOR IN BRONZE, AND THE GOLD-AND-IVORY GODDESS

Of the other famous athlete Polyclitus made, also in bronze, there are again only copies left; the best are in the British Museum. This statue is called Diadumenus. It shows a victor at the Olympian festival binding about his brow the sacred band, or fillet, whereon the judge would presently place the victor's wreath.

The wonderful Hera (queen of heaven in Greek mythology) in gold and ivory that was set in the Heraeum, near Argos, showed very effectively that Polyclitus was capable of a great flight of imagination and beauty, and that his work was not all of the athletic type. But of this lovely goddess, described by several ancient writers, so far no copies have been found.

Polyclitus perfected another type of statuary—the Amazon. The type was used by many other sculptors of his day, and it figures largely in the work of succeeding generations. The Amazons

were well-built, muscular women whom legend represented as coming over from Asia to fight a certain tribe of the Greeks. When, just after the Persian Wars, these mythical persons were introduced into Greek art, the form they took was an act of imagination on the part of the sculptor, and in the popular mind the legendary fights between the Amazons and the Greeks were easily made to stand for the recent struggle with the Persians.

The Amazon as shown by Polyclitus was a powerful woman, essentially Greek, and as nearly like a male athlete as her sex would allow. She wore the simplest short garment, a *chiton*, and had broad shoulders and narrow hips.

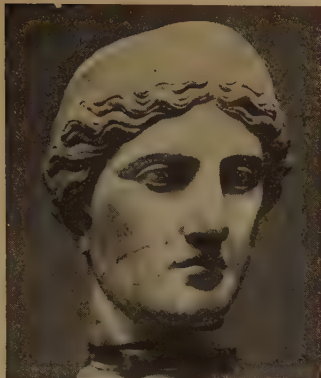
HOW POLYCLITUS BROKE AWAY FROM AN OLD FASHION

To the sculptors of the Argive school, headed by Polyclitus, only beauty and perfection of form were essential. They troubled so little about facial expression in their statues that most of the faces could have been exchanged one for another without anyone's noticing the change. This same tradition holds in the Amazon type created by Polyclitus. The women have beautiful, calm, unmoved faces wherein, though they are generally shown wounded and emerging from a fight, no trace of pain or struggle is allowed to show. Later representations of the Amazons break away from this tradition and show a certain amount of emotion.

But although he followed this convention of the "mask" face, Polyclitus was the chief man in his generation to break away from another and more powerful convention, and the effect of this change on Greek art was of lasting importance. Until his day the Greeks had kept to the Eastern habit, made powerful by four thousand years of Egyptian practice, of showing a man with both feet resting squarely on the ground and the weight of the body divided between them.

Polyclitus had watched men enough to know that this was not natural, and he had sufficient imagination to see the possibilities opening to sculpture if the convention were done away with. He therefore began to make statues with one foot free, its toes resting lightly on the ground, the weight of the body being supported by the other foot. All his important statues show this new pose, and it was freely adopted by other sculptors.

NOBLE WORKS BY GREEK SCULPTORS



Juno, now in the Elgin Room of the British Museum.



The Head of Athene, by Phidias.



The Head of Æsculapius, now in the Elgin Room.



A reconstruction of Myron's beautiful statue of the Discobolus.

THE YOUTH OF ANCIENT GREECE KNOWN THROUGHOUT THE WORLD TO-DAY

Another tradition of the ancient East was shattered triumphantly by Myron, a contemporary of Polyclitus. The Egyptians had decreed that the centre line of a sculptured body should always be vertical. Myron broke away from this very triumphantly. The chief specimen of his work on the new lines is known, by means of plaster casts, to almost every art student in the world. It is called the *Discobolus*, and shows a youth bending forward making ready for the act of hurling a discus. The plaster casts are taken from a fine copy of the original, now in Rome.

Though it is said that Myron passed his student years with Polyclitus in the studio of the Argive sculptor Agelados, he worked in Athens and is generally called an Athenian. He shares with Polyclitus the chief place in the sculpture of athletes. But Myron shows the influence of the Attic school in his work. The ideal of the Doric school was pure physical force, rather heavy and reposeful; that of the Attic school was agility. And the faces in Myron's sculpture are lighter and more individual than those of Polyclitus.

A fine example of Myron's work, much talked of by ancient writers, was the statue of *Ladas*, the famous runner who died after winning the long foot-race at Olympia. The statue of the dying athlete was vivid and powerful in spirit, the emotions of the tragic hour were clearly shown in the face and gesture of the runner—the sureness of victory, the single purpose of reaching forward to the victor's crown.

THE MASTER OF SCULPTURE WHO BELONGS TO ALL TIME AND TO THE WORLD

A great many fine statues in bronze were made by Myron, but only copies of them remain. One of the best is *Marsyas* the satyr, a copy of which is in the Lateran in Rome. It shows *Marsyas* about to pick up the flute *Athene* had thrown down, and starting back as he suddenly sees the goddess confronting him.

Polyclitus and Myron would have made any epoch remarkable. It happens that they were contemporary with the supreme master of Greece, *Phidias*, and so are apt to be a little overshadowed.

And *Phidias* alone would have glorified

a whole century and made any country immortal. His work was the fine flowering of the Attic ideal, and this was a threefold ideal: a spiritual conception of subject, a unique sense of beauty, and a passion for perfection. These forces meeting in *Phidias* set him apart; he belongs, not to any country or period, but to all time and to the world.

Pausanias and other writers taken together create a word-picture of *Phidias*' greatest sculpture. He made so many huge statues that one wonders how the work was ever achieved at all. The two most famous are the figure of *Zeus*, father of the gods, set up in the temple at Olympia, and that of the goddess *Athene*, in the Parthenon. Both were in wood, covered with sheets or plates of gold and ivory, a combination to which the Greeks gave the name of *chryselephantine*.

THE WONDERFUL BEAUTY OF THE COLOSSAL STATUES OF PHIDIAS

Of these two statues, so supremely grand in conception and execution, it might be said that they, being dead, yet live. For they were of such a quality that ancient writers, accustomed to the wealth of Greek sculpture, spoke of them with awe and reverence; they recognized *Phidias* as more than a sculptor, a worker in gold and ivory, a maker of statues of a colossal size—he was the sculptor of the ideal. And in this way the work of *Phidias*, added to the robust athleticism of *Myron* and *Polyclitus*, rounds up and makes complete the golden years of Greek art.

The *Zeus* at Olympia was so huge, being about seven times life-size, that, as one writer said, the father of the gods could not have risen from his throne without putting his head through the temple roof. The *Athene Parthenos*, too, was colossal. Figures wrought on such a scale cannot fail to be awe-inspiring. But to the majesty of the sculpture was added that indescribable spiritual quality with which *Phidias* imbued his work, so that for all time his *Zeus* has remained unchallenged, the highest pagan ideal of a god who must be portrayed with the form and lineaments of a man.

The throned *Zeus* seems to have been one of the wonders of the old world. You will find a picture showing a modern idea of it on page 2608. The throne itself was worked in gold, ivory, ebony and precious stones, and is considered the

finest specimen of Greek decorative sculpture. Many pages could be spent describing the carvings which filled every possible space and yet were subservient to the whole gigantic figure. Phidias spared no pains in the "details" of his statues, and he owed his downfall to this very care.

It would seem that men like Phidias ought to be divinely armed against the "slings and arrows of outrageous fortune," to be left free of all trouble for the sake of their work. But it generally happens that by their very delicacy of soul they are more easily harmed than are most of their fellowmen.

THE ATHENE OF THE PARTHENON AND THE FATE OF PHIDIAS

To one of the figures on the shield of the great Athene may be traced the lamentable end of Phidias' life. Around the immense shield whereon the goddess rests her hand the sculptor carved details from the battle of the Greeks and the Amazons. He placed himself and Pericles (the head of the Athenian State) together among the combatants, and something in the way they were represented incurred the wrath of the great statesman. Whether Phidias was put to death, or banished, or voluntarily exiled himself, we do not know, but we know that clouds of jealousy and bitterness made a tragic darkness of his last years.

This Athene, the centre of so much talk and praise, was not the only statue of the goddess made by Phidias. Several are mentioned by ancient writers and are preserved by way of copies made in Roman times and on the coins of the period. One of these statues, executed in Phidias' early years, was a huge Athene in bronze which stood in the open space on the Acropolis. But it was the ivory-and-gold Athene set inside the Parthenon that became the wonder of Greece.

A copy of this, the Athene Parthenos, was found at Athens in 1880 by excavators. Our art museums have casts of the copy. But we should remember, when we look at one of them, that the Roman sculptor who made the marble copy, though he may have reproduced it as faithfully as he could, probably failed to catch the spirit of the original. It is likely, too, that the pillar he placed under the goddess's right hand, or something like it, may have been introduced long after the death of Phidias for the purpose of supporting the statue.

The lovely ivory-and-gold Athene, and probably the Zeus, were demolished in a reaction against the spirit of Greece when the great ancient empires had fallen.

One of the worst misfortunes that ever happened in the course of world development was the destruction of the greater part of Phidias' sculpture. In order to get some idea of what his glorious work was like, let us think about the finest bits that we have left—the fragmentary sculptures of the Parthenon.

The Parthenon was a rectangular building surrounded by a row of columns. Above the architrave surmounting the columns was a series of sculptured panels called *metopes*, separated by *triglyphs*—panels which were decorated with vertical lines and grooves to represent little columns. Round the four outside walls of the temple itself, inside the colonnade and under the ceiling of the portico, ran the frieze—an unbroken band of sculpture in low relief placed at a height of thirty-nine feet. In the metope panels are groups skillfully fitted into the spaces. They represent struggles between gods and giants, between Greeks and Amazons, and between Greeks and Centaurs. Of these you have examples on page 4217.

THE PARTHENON FRIEZE, A PRO- CESSIONAL PAGEANT IN STONE

The whole frieze, which is about four feet from top to bottom and extends to a length of 523 feet, is devoted to a long procession, a usual feature of a great religious festival held in Athens every four years. During the festival a great number of people of all classes gathered together to carry from the town to the Acropolis a sacred robe specially woven for a certain very ancient wooden statue of the goddess Athene kept in the Erechtheum. In his sculptured picture Phidias made it a glorified procession, a pageant in stone embodying the spirit of all processions the world has ever known. At the east end of the building he shows the gods and goddesses with the priest and priestess of Athene and the city magistrates waiting. Along both sides and across the western end the spirited procession moves—horsemen and musicians, animals for sacrifice, chariots and their drivers, youths and maidens. The figures, for all their variety, give a sense of rhythm and balance, like splendid music.

Over the metopes and triglyphs at either end of the building, in the great

triangular spaces of the pediments, or gables, were groups of statues telling stories connected with Athene. In the east pediment is represented the legend of her birth, full-armed, from the head of Zeus; in the west pediment, the contest between the goddess and Poseidon, god of the sea, for supremacy in Athens. In the central part of each pediment is a group, instead of the single figure used in the older temples. And while the postures of all the figures fit them exquisitely into the parts of the triangle where they are placed, there is no stiffness, no unnatural posing. The beauty of these figures when they were in their perfection can hardly be imagined. We may well believe that the world has never seen more marvelous and beautiful sculpture than that of the Parthenon.

WHY THE PARTHENON SCULPTURES ARE IN THE BRITISH MUSEUM

This lovely marble building was ruined in an explosion in 1687 during the siege of Athens, then a Turkish possession, by the Venetians. In the early part of the nineteenth century the fragments of marbles which had been thrown down, and lay covered with the debris of two hundred years, were rescued and carried to England by Lord Elgin. They are now in the British Museum, and are popularly called the "Elgin Marbles." These fragments of sculpture have been put together with great care, and by the help of imagination we can see something of their meaning. A far greater flight of imagination is necessary before we can see in the mind's eye the whole unbroken mass of the Parthenon—pillars, friezes and sculptured panels—aglow in the sun.

The work of putting together the fragments Lord Elgin had saved was greatly helped by the study of the drawings of a French artist named Carrey, who had sketched the sculpture of the Parthenon while the walls were almost intact, a few years before the Venetian bombardment.

In the Elgin Room, where the marble fragments of the frieze, metopes and pediments are set up, they are helped here and there by casts of the remaining portions which are preserved at Athens. With patience and imagination we can reconstruct for ourselves something of the noble spectacle. The frieze is the most easily understood. The figures almost seem to move; a wonderful grace lightens them.

There is nothing in art more astonishingly fine than the movement and drapery of these broken marbles, to be best seen in the group of headless Fates from the east pediment. It is difficult to believe that hard marble can so give the feeling of soft, clinging robes.

No one has been able to ascertain how far the Parthenon marbles were directly the work of Phidias; the probability is that they were all supervised and directed by him and that part of them came under his own hand.

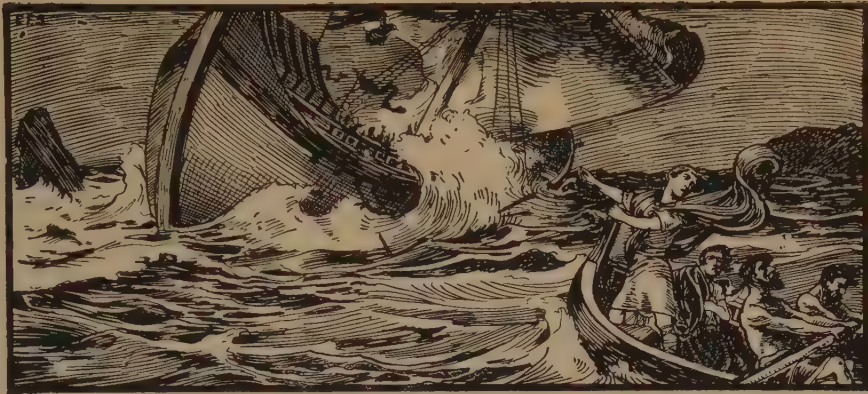
It would seem as if the work of the whole generation had caught something of the master's genius. The spirit of Phidias guided and stamped other buildings on, or near, the Acropolis, even though their erection may have been of a later date. These were the Erechtheum, the Theseum, and the little temple of Athene Nike (usually called the temple of the Wingless Victory). The noble figures of maidens, the caryatids, which take the place of columns in the portico of the Erechtheum, are in the style of Phidias. You may see them on page 1068. And the outer frieze and balustrade sculptures of the little Nike temple are most beautiful and graceful.

THE TORCH OF PHIDIAS THAT WAS SLOW TO BURN OUT

In the British Museum, near the Elgin Marbles, is another frieze, dating from the fifth century B.C. and taken from the temple of Apollo at Phigalia, in Arcadia, built by Ictinus, the architect of the Parthenon. Less powerful and interesting than the Parthenon frieze, it shows figures of Greeks and Amazons and Greeks and Centaurs in combat.

Among the fine specimens of Greek sculpture of this period is the so-called Throne of Venus, in Rome. It shows the birth of Venus from the sea, while other reliefs show Venus as a girl playing the flute and as a matron holding an incense-box.

Like most great artists, Phidias had a large following of pupils and helpers. The torch that he handed on was slow to burn out. His two most famous pupils, Agoracritus and Alcamenes, carried his traditions far; and it must have been someone who had felt the inspiration of Phidias who made the lovely Venus of Milo, which in 1820 was discovered on the island of Melos and is now in the Louvre.



WHEN THE WHITE SHIP WENT DOWN

WE do not know very much about Prince William, the only son of Henry I, except that his father was very fond of him and that he very much disliked the people of Normandy, which his father had conquered. But there is one deed of his which we like to recall, because it shows he could think of another's safety before his own. His unselfish act was his last, though he was but eighteen.

Prince William's father was constantly at war with the French king, who resented the presence of the English in Normandy and especially of King Henry, who had unjustly taken that country from his brother Robert, the rightful ruler.

In 1120 Henry made peace with the king of France and set sail from Barfleur in Normandy for his return to England. The wind was favorable, and the vessel was soon out of sight of land. Prince William and his courtiers were not ready to start with the king, and it was not until night-fall that they left the port, for the stupid courtiers gave wine to the sailors, and then the rowers were not in a fit condition to take the boat safely across the Channel. It was called the White Ship, and was commanded by the same man who had rowed Prince William's grandfather across to the conquest of England fifty-

CONTINUED FROM 4092



four years before. Some of the sensible people refused to trust themselves to the incapable sailors, and those who remained in the boat soon repented doing so. There was no moon, and the man who

was steering drove the vessel on to one of the dangerous rocks near Alderney. There were nearly 300 people on board. They managed to lower a boat, and put Prince William with a few others into it. Then the prince remembered his half-sister, and ordered the little boat to return to rescue her. But as soon as the small boat got alongside the ship, the frantic people jumped into it, and, of course, the boat was sunk.

It is said that only two men got away from the wreck. One was the captain, who afterward drowned himself when he knew the prince was lost; the other was a butcher of Rouen, who clung to the mast, and was picked up by a fishing boat next day. It was he who told of the wreck and of the way Prince William lost his life, and of how 140 young men belonging to noble families had died.

Not one of the courtiers dared to tell the king the fate of his only son, in whom all his hopes centred; but at last the nobles sent a weeping page to him with the tidings that the White Ship had been lost and all had perished. It is said that King Henry was never seen to smile again.

THE GIRL WHO WALKED TO LONDON

THE girl about whom this story tells was born some two hundred years ago. She was the daughter of poor people, who were living in Scotland. Now, there was a law made at that time which was very unjust, and the punishment for breaking this law was death. Our heroine, whose name was Helen Walker, had a younger sister whom she loved very fondly, and this sister was charged with breaking the cruel law. Though she was innocent, it was almost certain she would be condemned.

It so happened that if Helen had been willing to tell the judges a falsehood, which no one could ever have found out, her story would have been taken as a proof that her sister had not done what she was accused of. She could have saved her sister by telling a lie, and no one would have known.

But Helen had been taught that there is nothing in the world which can make it right to tell a lie. She would have given her own life gladly to save her sister; but she could not have uttered a falsehood to save herself, and she would not utter a falsehood to save her sister. The sister was not like that, and, when Helen went to see her in prison, she pleaded passionately, begging her to tell the lie, and reproaching her for her cruelty in refusing to do so easy a thing merely because it was wrong. Some people, too, would have told her that it would not really be wrong, with so good a reason for it. But Helen would not do it, in spite of all temptation.

But, if she would not lie, there was still one way in which she might perhaps save her sister. The judges would condemn her to death; but if Helen could win the King's pardon she would be set free. Yet what chance was there of getting the King's pardon? The King lived in

London, hundreds of miles away. How could a poor girl in Edinburgh get to the King in London? To go from Edinburgh to London nowadays does not seem very alarming, but two hundred years ago it was a very different thing. There were no trains. Great people could go in their carriages, or gentlemen might go on horseback; people who could afford it might take the coach. But there was no way for a poor girl like Helen except to tramp the whole long journey on foot, day after day, with just the chance of a friendly lift from a cart now and then; so the journey would be weary and long. Worse than that, it would be dangerous, for in those days highwaymen and footpads and tramps often attacked people who were going along the country roads alone. But it was the only chance of saving her sister, and, starting on her long walk, she kept up her courage until she did reach London in safety.

Now in London there was a great Scottish lord living, the Duke of Argyll, to whom Helen's father had once done some service. So, when she got there, Helen sent a letter to the duke to entreat him to help her to get speech with the Queen, for the King himself was away from England. The duke admired her courage and her truthfulness so much that he did help her. When she came before the Queen, she pleaded so movingly, showing that her sister was really innocent, that she persuaded the Queen, and the pardon was granted.

This is a true story, and out of it Sir Walter Scott, who loved romance and heroism, made up the story of *The Heart of Midlothian*. So, because his heroine, Jeannie Deans, will never be forgotten, the fame of the real Jeannie—Helen Walker—and of her golden deed will live forever.



A WOMAN AGAINST A KING

THE Earl of Nithsdale was condemned to death for trying to put James, the Old Pretender, on the throne in 1715. His wife heard of his imprisonment in the Tower, and went up to London from Scotland, traveling through deep snows. But the Governor of the Tower would allow her to enter only on condition that she remained a prisoner. However, she could not then have helped her husband; so she bribed the guards, got admission daily, and quite won their confidence.

After fruitless attempts to obtain a pardon from King George I, Lady Nithsdale made up her mind twenty-four hours before the time of execution that she would help her husband to escape. At first he would not listen to her plan lest it should put her own life in danger, but at last he yielded to her entreaties.

The evening before the date fixed for the execution of the earl and other prisoners, Lady Nithsdale took two women with her into the Tower, and in turn brought them to her husband's room to say farewell to him. The first, a Mrs. Mills, wore concealed garments, which the second, Mrs. Morgan, put on when quitting the Tower; for Mrs. Morgan took off the outer garments she wore and Lady Nithsdale put them on her husband.

Every little detail was carefully thought out beforehand, and the cleverness, skill and presence of mind shown by this resolute woman were very remarkable. Mrs. Mills was directed to come in, crying and afflicted with grief, so that when Lord Nithsdale, who personated her, went out, he acted the same way. He wore a hood and kept his face buried in a handkerchief to cover up his beard. Lady Nithsdale walked close behind him for a little dis-

tance to conceal his manly gait, and then returned to his empty room. The pretended Mrs. Mills had been hurried off to fetch Lady Nithsdale's maid.

In the deserted room, Lady Nithsdale carried on a pretended conversation with her husband, asking questions and imitating his voice in answer, as well as striding up and down to make the people in the outer room think her husband was still there.

Thus she allowed ample time for him to get clear of the Tower; then she opened the door, and, standing half in the room with hands on the door, took a pretended farewell for the night, pulled the string through the latch of the door, so that it could only open on the inside, and, telling the servant he need not trouble to take in candles, passed down the stairs and drove off in a coach.

The whole story, related by Lady Nithsdale some time after, shows wonderful self-control, skillful acting and self-sacrifice, for she was hazarding her own life. King George was most furious when he found what she had done, and ordered her arrest; but she escaped by her clever wits, fetched her boy from Scotland, and joined her husband in France. Her descendants still treasure the shawl used as part of the disguise worn by the earl when he made his escape from prison and death.

So a high-spirited woman cheated the Tower of London of a victim, and well might a victim be spared from the unhappy company that have languished within its ancient walls. Too often there was no rescuer keen-witted enough to open the doors. Queens and princesses and noble men like Sir Thomas More and Sir Walter Raleigh were among those whom only death delivered from that grim Tower.



BRAVE COUNTESS JOAN OF BRITTANY

BESIDE the English Channel, in the far northwest of France, is Brittany, where the people are kinsmen of the Cornish and the Welsh. The English kings longed for the possession of this country in the Middle Ages.

Now, it happened that a Duke of Brittany died, leaving no child to succeed him, and a dispute arose between Charles, Count of Blois, who had married the daughter of the duke's next brother, and John, Count of Montfort, the youngest brother.

Edward III of England took the side of John of Montfort, and the French that of the Count of Blois. The French captured Nantes, where John of Montfort was, and the king of France kept him a close prisoner in the Louvre.

But John of Montfort had a brave wife Joan, who never dreamed of giving way to her misfortunes. She summoned the inhabitants of Rennes before the castle where she lived, and, presenting to them her little son, appealed to them to rise and defend the last male heir of their ancient line of dukes. The English, she said, would surely come before long to the help of a brave people.

Her appeal to the Bretons was not in vain, and the men rallied round the countess, who then visited other towns and arranged for their defense, proving herself a skillful leader and most able general. Sending her little son over to England for safety, she then returned to Hennebont, near the coast, there to await succor from England.

The Count of Blois thought he could soon conquer a duchy defended by a woman, and so he gathered an army, captured Rennes, and besieged Hennebont.

The countess put on a suit of armor, mounted a war-horse, and was ever on the walls where the attack was sharpest, encouraging her men at every point, and

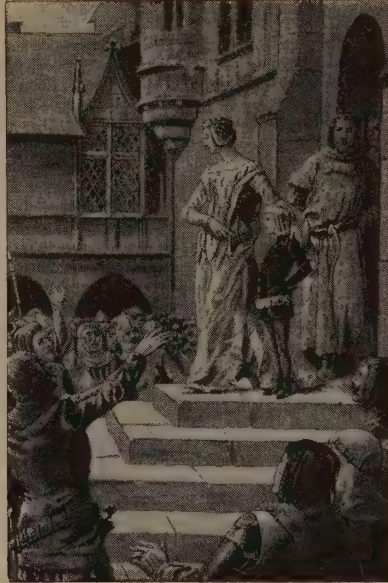
directing their defense. Noticing the camp of the besiegers unguarded one day, she led 500 men to it through a postern gate in the walls, and setting fire to the baggage, diverted the attention of the enemy. Then she found herself and her little band cut off from the town, but she galloped away into safety and reached Auray. Five days later she fought her way back into Hennebont. There she found the Bishop of Leon about to surrender the town to her enemy the Count of Blois.

Day after day dawned, night after night passed, but no succor from England came to the despairing town. At last one day, when the bishop was actually discussing the terms of surrender with the Count of Blois, the countess mounted yet once more a high tower and looked toward the sea. Shading her eyes with her hands, she gazed longingly across the water. Were the English ships never coming? Ah, what was that small speck in the distance, and another, and yet another? Eagerly she watched until she felt

there was no longer any doubt. It was really the English fleet, coming at last to her aid.

Soon after, Sir Walter Manny brought the vessels into the harbor, attacked the camp of the besiegers, and burned it to ashes. A treaty was made by which the Count of Montfort was set free, but he died soon after in one of the frequent encounters. Through it all the English king, Edward, proved a firm friend to the countess and supported the cause of her little son. Though after a long struggle Brittany became part of France, yet the brave countess upheld her son's rights, so that, when older, he ruled as Duke of Brittany, and was known as John of Montfort.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 4577.



Presenting her little son to the people, the countess appealed to them to rise and defend the heir of their ancient line of dukes.



R. H. Barham.



Ebenezer Elliott.



Thomas Hood.



Walter Savage Landor.



John Clare.



Horace Smith.



George Crabbe.



Mrs. Hemans.



Hartley Coleridge.



Thomas Moore.

VICTORIAN AND GEORGIAN POETS

IN telling the story of English poetry we have traced its growth in some detail to the nineteenth century, and its main features through the greater part of that century, as they appear in the most commanding poets of the period. During that century poetry expanded in its variety and popularity as it had never expanded before, and reached the people in ever widening circles.

It was not that poetry reached its greatest heights, though its higher levels—as in Wordsworth, Tennyson, Browning, Byron, Shelley and Keats—were high; but it was more generally read and practiced.

There had been times when poetry was a fashion among the learned and fastidious. In the nineteenth century it became a more popular fashion. It expressed the sentiments common to mankind. Its subjects were found more often in the lives of average men and women. And so, besides the poetry that will endure because of its dignity and power, there is a wider range of popular verse that expresses the age in various ways. It is poetry of this kind that we must notice here.

The change in subject from the life of towns to the people of the country had been made by Goldsmith, Cowper, Wordsworth, and in the songs of



Burns. The movement spread broadly even during the days when romantic subjects were the fashion, under the influence of Scott and Byron. The greatest example of the change is the steadily pursued poetry of George Crabbe.

Crabbe was born at Aldeburgh, on the Suffolk coast, a son of the schoolmaster and parish clerk. He became a country surgeon in a small way, took to writing, went to London to publish his verses, was helped by Edmund Burke, and then drifted back into the country as a clergyman. For thirty-six years he wrote descriptions and tales of the lives of country people. In style he was a stilted imitator of Pope—"a Pope in worsted stockings"—but the contents of his poems were entirely different. He pictured the characters and doings of all kinds of people who lived in, rural England when agricultural country life was the foundation of England far more than it is now.

His weaknesses were that he was devoid of humor, and his sober-paced narrative becomes monotonous. Within these restrictions he is a true poet, and he finally illustrates how poetry had at last taken the life of ordinary people as one of its most important subjects.

Though poetry in the period we are

speaking of embraced the lives of the mass of the people, it was not in any considerable measure expressed by the people themselves, as in Scotland it had been by Robert Burns. The only conspicuous exceptions were James Hogg, the Ettrick shepherd of Scotland, and, in later years, John Clare, the Northamptonshire peasant poet.

**THE SHEPHERD'S SON WHO GAVE UP
FARMING TO WRITE POEMS**

James Hogg, who had assisted Sir Walter Scott in his collection of the songs and ballads of the Border District, became a friend of the men who formed the Scottish literary circle of his day. After failing in farming he became himself a worker in the literary field. He was a genuine nature-lover, and had a mind attuned to fanciful romance, as is shown by his charming poem *Kilmeny*.

John Clare is the most interesting instance in English literature of a spontaneous outburst of poetic impulse among the English peasants. He was born in 1793 in the village of Helpstone, near Peterborough. His parents were very poor, and he was never able to rise for long above a poverty like theirs. Yet from his youth he had a strain of poetry in him, which attained sincere, tender, and sometimes artistic expression.

In the language there is nothing more poignantly pathetic than these lines, written from the asylum in which he spent his last years.

I am! Yet what I am who cares or knows?
My friends forsake me like a memory lost.
I am the self-consumer of my woes;
They rise and vanish, an oblivious host,
Shadows of life, whose very soul is lost.
And yet I am—I live—though I am tossed

Into the nothingness of scorn and noise,
Into the living sea of waking dream,
Where there is neither sense of life, nor joys,
But the huge shipwreck of my own esteem
And all that's dear. Even those I love the best
Are strange—nay, they are stranger than the
rest.

I long for scenes where man has never trod—
For scenes where woman never smiled or
wept—

There to abide with my Creator, God,
And sleep as I in childhood sweetly slept,
Full of high thoughts unborn. So let me lie:
The grass below; above, the vaulted sky.

Much later the poetry of country life was expressed with an exquisite simplicity, in the dialect of his native Dor-

setshire, by Parson Barnes, a clergyman and schoolmaster. Some of us may find it difficult to reach through an unfamiliar dialect the deep tenderness of William Barnes's verse, but few poets have been able to unseal by such simple means the fountains of the human heart. Barnes died at a great age in 1886, and in his own locality is as well known as Wordsworth was in his Lake country.

**THE ARTIST-POET AND THE SWEET
SONGSTER OF IRELAND**

The note of simplicity which was established in English verse by Wordsworth was illustrated in the imaginative poetry of William Blake, the painter of symbols, who lived from 1757 to 1827. Blake's writing, like his pictures, was as fanciful as the thoughts of an active-minded child, but with truth at the heart of it. He stands alone, an original, who can be read with understanding by us in our younger days, though his symbolical meanings sometimes baffle the wisest.

Thomas Moore was a poet whose life covered the whole of the period at which we are glancing. It illustrates the uncertainty of much literary fame. He was a genial Dublin Irishman, sparkling with sentiment and song, who passed over to England and conquered London socially. There was a moment when he had made a small fortune by his poetry that was supposed to interpret the Persian East. His *Lalla Rookh* was read as a fashion on the Continent as well as in England, but he is now, and will be, Tom Moore, the sweet-voiced sentimentalist of Ireland, the poet of polished regrets expressed in drawing-room songs of which the *Last Rose of Summer* is a sample.

The Scottish poet Thomas Campbell represented Scotland in London in the same period that Tom Moore represented Ireland, and, like Moore, he made a passing success with graceful books of verse that are quite pleasing but do not get down to life very closely. Campbell struck a far more resounding note in his robust patriotic songs, such as *Ye Mariners of England*, and his vivid *Battle of Hohenlinden*, of which he was a witness. He was the battle-laureate of the Napoleonic Wars.

**THE LAYS OF LORD MACAULAY
BELOVED BY ENGLISH BOYS**

Patriotism was vigorously represented by the English lays of Lord Macaulay,

whose scenes from Roman history and Henry of Navarre have stirred the blood of generations of schoolboys. Macaulay's rousing measures have by some been denied the name of poetry, but that is not how the heart of boyhood judges.

The same argument applies to the domestic verse of Mrs. Hemans. She was unhappily married—though her name was Felicia she had little domestic felicity; and she died in 1835, when she was only forty-one. Her poetry never reached the higher planes of literary art, but we claim that such simple poems as *The Graves of a Household* and *The Stately Homes of England* are poetry and will long be felt as such by her many readers throughout the world.

Poetry was taking a very wide range of subject and style apart from the writings of the masters of song. There was the classical style of Walter Savage Landor, too ambitious and classical to preserve a simple vitality. The inherited vision of Hartley Coleridge, who is one of the most pathetic figures in our story of writers, the little boy friend of Wordsworth, was rare in its quality, but had an insufficient backing of firm character. He was born with the true poetic line, but could not sustain its strength, though he has moments of exquisite grace.

A new departure came in such work as the fierce political verse of Ebenezer Elliott in his *Corn Law Rhymes*, unless we regard some of Shelley's impassioned appeals as the true beginning of poetry championing the people's cause.

THE GRADUAL DEVELOPMENT OF THE POETRY OF HUMOR

Other forms of verse that were introduced now and developed more fully later were the poetry of humor, as in the *Ingoldsby Legends* of R. H. Barham, a canon of St. Paul's, and the poetry of parody in the *Rejected Addresses* of James and Horace Smith, two clever brothers.

In a singular degree the wide variety poetry had attained was illustrated by the work of Thomas Hood, a poet who lived from 1799 to 1845; whose serious merits have been somewhat obscured by his popularity as a humorist. Hood's humor is partly concealed by his skill in the shallow and fleeting fashion of the pun, a mere verbal quibble; but he was a lovable and great-hearted man, with a deep-veined sense of humanity, as shown

in his *Song of the Shirt*. Hood will always be one of the tenderest figures of the literary world, a poet who died with much of his music in him.

This survey of English literature closes with a glance at the poets of yesterday and to-day. By "yesterday" is meant the period covered by the memory of people still active; and by "to-day" is meant the time we live in, and poets living and writing now.

During the last half of the nineteenth century Tennyson and Browning held unquestioned supremacy, but with them, as stars of lesser magnitude, yet bright, shone Matthew Arnold, Algernon Charles Swinburne and William Morris. Later, George Meredith had literary but not popular prominence, and later still Thomas Hardy began to assume as a poet a rank equaling that which he had won as a novelist. William Watson and Rudyard Kipling laid the foundations of a fame that has endured and extended to the present time.

The twentieth century, especially its second and third decades, including the war period, greatly increased the output of verse, but judgment on its permanent influence on literature must still be suspended.

A feature in the judging of poetry by contemporaries has always been, and always will be, that fashions in writing and fashions in criticism are made by literary cliques. Thus clashings in prejudice occur that are wondered at by later generations.

ALGERNON CHARLES SWINBURNE AND HIS AMAZING POWER OF EXPRESSION

The storm centre of English poetry in the period we have called yesterday was the verse of Algernon Swinburne. Oxford felt great expectations about him, and when he began to write, as an avowed pagan of the Grecian type, in a style that was a swinging kind of chant, he mesmerized the youth of his generation. His *Atalanta in Calydon*, framed on Greek models, had choruses that sang themselves, and seemed sound poems without regard to the ideas they conveyed. They were used by enthusiasts as a rhythmical march:



A. C. Swinburne.

Before the beginning of Years,
There came to the making of Man,

Time with a gift of Tears,
Grief with a glass that ran;
Pleasure with Pain for leaven,
Summer with flowers that fell,
Remembrance fallen from Heaven,
And Madness risen from Hell.

Then came Swinburne's several series of Poems and Ballads, his Songs before Sunrise, some violent political outbursts, poetical plays of great length, tender studies of childhood, and lyrical raptures about the sea, with prose writings that were like a torment, whether composed in praise or in invective.

Swinburne was a true poet, with a remarkable gift of metrical ingenuity; but as a man he was unbalanced intellectually and morally. Such a man could never rank among the great poets. His most ample fame came in his lifetime; but he will remain a poet of distinction, as well as a highly interesting metrical expert. He is perhaps best represented in his *Ave Atque Vale*, commemorating the French poet Baudelaire.

During a large part of his life Swinburne lived at Putney with his friend and guardian Theodore Watts-Dunton, the critic, who curbed the extravagance of the poet's later years, when he was persistently imitating himself, and so helping to make his uncommon style seem common.

THE POEMS OF ROSSETTI THAT WERE RECOVERED FROM THE GRAVE

The artist-poet Dante Gabriel Rossetti was a friend of Swinburne's youth. Rossetti was a recluse, partly through his addiction to the poet's bane, opium. The sonnets on which his vogue as a poet depended were buried in the grave of his wife, whose portrait appears repeatedly in his pictures. Afterward the manuscript was recovered from the grave and printed. Rossetti's sonnets are fine examples of delicate poetic workmanship, but they have an exotic air, natural to a mind that lacked touch with healthy existence.



William Morris.

William Morris, who belonged to the same circle as Rossetti, and became a designer of artistic homes, was a far more robust poet than Swinburne. He was equally capable of action and of serenity. Turning from painting to verse, he found his earlier subjects

from long ago in *The Defence of Guinevere* and *The Life and Death of Jason*. Then he conceived the plan of telling a number of Old World tales in quiet verse, and as "the idle singer of an empty day" won public favor through his *Earthly Paradise*. His description of himself as a narrator of classic legends is

Telling a tale, not too importunate,
To those who in the sleepy region stay,
Lulled by the singer of an empty day.

Morris was a master of the art of smooth and graceful narrative, but he could also be bold, vigorous and elemental, as he showed in his *Norseland* stories, beginning with *Sigurd the Volsung*. Later, he gave himself up largely to socialistic propaganda through imaginative prose stories and poetic rallying-calls to "the people marching on."

A PROLIFIC WRITER WITH A GREAT AND VARIED IMAGINATION

The poet who will probably speak longer than any others of his day, except the greatest, to readers in the coming ages is Matthew Arnold. In whatever work he became active he attained distinction, but it is as the poet of a thoughtful mood which often recurs in the history of the human mind that he will live. To him, what he calls



Matthew Arnold.

the Virgilian cry,
The sense of tears in mortal things,

made a strong appeal. He was inclined to feel it because of his attitude toward religion. Though he was the son of the famous schoolmaster Dr. Arnold of Rugby, he had followed the drift of thought in his day, and had lost the firm faith of unquestioning Christianity. Nor had he gained any assurance that would fully take its place. He saw the world

As on a darkling plain,
Swept by confused alarms of struggle and flight,
Where ignorant armies clash by night.

And yet he did not wholly give way to despair. He perceived a great calmness at the heart of nature and sought to preserve that calm in his soul. Seriousness and tenderness were combined in him with a grave humor. He always saw life as a noble strife for whatever makes for righteousness, and appealed to his fellows to fight the good fight.

Let the victors when they come,
When the forts of folly fall,
Find thy body by the wall.

With deep human sympathy, in poetical language of classical purity, sustaining a dignity only slightly relaxed by humor, this poet represented a faltering faith common in his day, yet not entirely failing. Arnold shows how painfully sincere men adjusted their religion in accordance with the new revelations of history and science. He was no rebel, as Swinburne was, but a sincere and reluctant doubter, seeking a sure foundation for the noblest creed he could possibly conceive.

A N AMBITIOUS POEM THAT WAS SPOILED
BY ITS CLUMSY METRE

Arthur Hugh Clough, one of the favorite pupils of the great Dr. Arnold of Rugby, died in his forty-third year, after a mental battle resembling that of his friend Matthew Arnold, but without coming so near to victory, either in belief or as a poet. Clough made the mistake of writing his most ambitious poem in hexameters, a metre that does not fit the English language naturally. The *Bothie of Tober-na-Vuolich* is a description of a Scottish holiday and its philosophic diversions. Concealed under this uninviting title and a hobbling metre, there is enough of the spirit of poetry to show that Clough was a man of promise who did not know how to set free the poetry that was in him.

One of the most prolific poets of the period who impaired his success by erratic ways and violent antagonisms, but who was a poet of unquestionable power and dramatic instinct, was Robert Buchanan. He was born in England of Scottish parentage. There were few forms of literary activity that Buchanan did not attempt with some success, but he was chiefly a poet. His most notable works were his powerful story-poem *White Rose and Red*, in an American setting, his weird ballad of *Judas Iscariot*, and his stirring version of *Balder the Beautiful*.

A poet of unquestionable genius, hampered pathetically by weakness of character, received full recognition only after his death in 1907. This was Francis Thompson, the author of *The Hound of*

Heaven, one of the most remarkable religious poems in the English tongue. Thompson was a victim of the drug habit. The most devoted friendships could not save him from his own weakness. Yet the grandeur of his imagination was equaled by his command of splendors in language. Poor Thompson remains one of the riddles of poetic possibilities.

A POET OF THE HOME AND A
POET OF THE OPEN AIR

Coventry Patmore made a considerable reputation by a pleasing poem on the domestic virtues. His *Angel in the House* has been kept well before the public by his admirers, and represents daintily the poetry of the home.

George Meredith put into his poetry the delight in the beauty of the earth which more slightly tinges his tales. In such poems as *Love in the Valley* he seems to be the pure spirit of poesy. He has not the range and variety of a great poet, but his note is choice and rare.

Among the novelists of the time who wrote some verse that will retain a place with the songs that cannot be forgotten was Charles Kingsley. His *Sands of Dee*, *Three Fishers*, *Welcome Wild North-easter* show how plaintiveness and robust energy can be found in the same nature, and how poetry often comes in flashes without a steady flame being sustained. Kingsley's longer poems are now extinct.

M AURICE HEWLETT, QUILLER-COUCH,
CONAN DOYLE AND HENRY NEWBOLT

Robert Louis Stevenson, novelist, essayist, letter-writer and poet, lives through all these modes of expression as a fascinating personality, and not least through his verse, recalling his own imaginative childhood. In no poet has the romance of childhood remained more vividly in the memory of manhood. Stevenson was a poet in whatever he wrote, but he was most of all the poet when he looked back on childhood through the slight haze of his own recollections, as in his *A Child's Garden of Verses*.

Other novelists who, besides Stevenson, Hardy and Kipling, have written verse with success are Maurice Hewlett, a faithful mirror of country life; Sir A. Quiller-Couch, who has romance ringing in his ears; Sir Arthur Conan Doyle, a robust chanter of patriotic lays; George Macdonald, broadly thoughtful as well as



Arthur H. Clough.

fanciful; and Sir Henry Newbolt, who most thrillingly carried the enthusiasm of the schoolboy on into lives of wider responsibility.

Henry Newbolt was a Clifton school-boy when a poet of combined charm and vigor was a house-master there. This was Thomas Edward Brown, a Manxman who made the Isle of Man the scene of much of his verse. A poet who could range from the

Fury and the din
And the horror and the roar,
Rolling in, rolling in,
Rolling in upon the dead lee-shore,

that one sees and feels in T. E. Brown's description of a heroic rescue by the Peel lifeboat to the lovely delicacy of his wee poem beginning, "A garden is a love-some thing, God wot!" will long hold a place, sure, if modest, in English literature. Brown, too, could weave much character into a homely tale told in verse, as witness his *Fo'c'sle Yarns*.

THE LIGHT OF ASIA AND THE LIGHT OF THE WORLD

Two poets who were popular for a time were Sir Edwin Arnold and Sir Lewis Morris.

Edwin Arnold wrote a poem in glorification of Buddha, whom he described in his title as *The Light of Asia*. The versification was fluent and the general effect pleasing; but neither Buddhists nor Christians accepted the view of Buddha taken by the poet, who painted him as a forerunner of Christ. Later, in the *Light of the World*, Arnold tried to give a companion picture of Christ, but did not succeed.

Lewis Morris was a cultured Welsh lawyer who began to write verse late in life as an obvious copyist of Tennyson.



Sir Lewis Morris.

His *Songs of Two Worlds*, published in the Seventies in three series, were widely read, and his *Epic of Hades* still more widely. Later he wrote *The Ode of Life*, a combined series of Odes picturing life from the cradle

to the grave. In later volumes he imitated his earlier efforts less effectively.

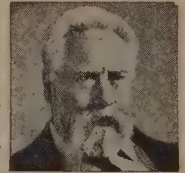
During the period we are noticing at least four women were sufficiently prominent as poets to be selected from the long list of versifiers. They were; Jean Ingelow, a Lincolnshire lady who wrote

a number of novels, but was much more distinctive in her verse, which was graceful with a rather plaintive undertone like the sound of sea-birds; Christina Rossetti, whose writing was also generally subnormal in tone, though religious, but who had gifts of fancy submerged by seriousness; Adelaide Procter, a daughter of the minor poet Barry Cornwall, and herself a most graceful writer of songs and hymns; and Alice Meynell, who won warm praise from critical judgment.

Among the most active authors, critics and journalists of the time many wrote more or less in verse. A typical instance was Andrew Lang, who, besides being prolific in almost every form of prose, could turn a graceful poem on any conceivable subject. The most skillful writer of the lighter forms of verse, on French models with the happiest glint of humor, was Austin Dobson, a civil-service official who had made eighteenth-century literature and life his special study. His poems contain the largest body of gay, light verse, with feeling always kindly, that any poet has left us. Edmund Gosse, whose reputation as a scholar and literary critic is international, is also a poet of distinction on a limited output of verse.

THE STIRRING VERSE OF THE MAN WHO INSPIRED RUDYARD KIPLING

Of poets who had a distinct individuality outside of classifications must be mentioned William Ernest Henley, the poetical inspirer of Rudyard Kipling. His first poems came out of Edinburgh Hospital, where he was a patient and whiled away the time by writing poetical description. Later he became a power in the literary world, and toward the close of his life wrote ringing patriotic rejoicings over the place of England in the world that sent echoes reverberating through the soul of young Kipling. We have only to read such songs as Henley's *England* to know whence the younger poet received his inspiration. Or this on the spread of the British races:



W. E. Henley.

We tracked the winds of the world
To the steps of their very thrones;
The secret parts of the world
Were salted with our bones;
Till now the name of names,
England, the name of might,
Flames from the austral bounds
To the ends of the boreal night.

Henley was a masterful poet on his own account; but he lives again in the poet who, more than all other men, made by his writings the British Empire one in mind and aspiration.

Of the poets now living, unquestionably Rudyard Kipling has had the most influence, and Thomas Hardy has written the greatest poem, while Sir William Watson is the best exponent of the classical English style.

THE UNDOUBTED POET OF THE BRITISH COMMONWEALTH OF NATIONS

Because Kipling began rhyming with trifling ditties, and went on to the use of the raw material of humanity in the soldiers of the line, and sailormen "rolling down the Ratcliffe Road," some have doubted whether his writing could be pure poetry. But a time came when, as great doings stirred the hearts of the British people as they had never been stirred before, it was felt that poetry had not spoken the national mind until Kipling had spoken it.



Rudyard Kipling.

If, following Henley, he had perhaps shown a too strong imperialism, he redressed that tone when he wrote his Recessional after Queen Victoria's jubilee celebrations. Though he has not a sure judgment of his own powers, again and again in a time of need he has struck the rock and brought forth the life-giving stream of pure poetry. Undoubtedly Kipling has been the real poet of the British Commonwealth of nations.

But if we take a wider sweep, and group history around dramatic human personality, then Thomas Hardy's great Napoleonic drama, *The Dynasts*, takes first rank among the poems of these later times. In range and power it is unrivalled. Hardy, too, in his later years, has reached a lyrical intensity and beauty unsurpassed.

SIR WILLIAM WATSON'S POEM IN PRAISE OF HIS BROTHER POETS

If anyone is inclined to challenge the right of Sir William Watson to high rank among English poets, he must dispose of the Hundred Poems by which the poet has himself chosen to be represented in his final selection. He won recognition by his *Wordsworth's Grave*, which includes a choicely worded appreciation of



Sir William Watson.

many poets, as well as of Wordsworth. Watson was from time to time drawn away from the poet's calmness to mingle in the strife of public life, which always generates more heat than light. But the main body of his verse has the dignity of high thought and a recurring note of greatness which will outlast all the tricks of mere form on which the latest criticism so largely relies.

TENNYSON'S SUCCESSORS AS THE OFFICIAL POETS OF THE NATION

After Tennyson the laureateship, which had been redeemed from old-time reproach by his appointment and that of Wordsworth before him, was given without reference to eminence in literature, and Alfred Austin, a most amiable journalist and a pleasing writer in prose and verse, became the official poet. He was followed, after a long pause, by Dr. Robert Bridges, a much respected Oxford representative of classical taste and skill in verse.

Among the poets who belong essentially to the twentieth century prominent positions have been taken by John Masefield and Alfred Noyes. In a poetical preface to his book *Salt Sea Ballads*, Masefield expressed with picturesque vigor and feeling his aims as a poet. His aim was to show the poetry in the life of the common man. With true loyalty he has followed after his ideal.



Alfred Noyes.

I have seen dawn and sunset on moors and windy hills
Coming in solemn beauty like slow old tunes of Spain: •
I have seen the lady April bringing the daffodils,
Bringing the springing grass and the soft warm April rain;
I have heard the song of the blossoms and the old chant of the sea,
And seen strange lands from under the arched white sails of ships.

Noyes began as far away as Japan, but since has come nearer home with growing success, and latterly has faced the great task of celebrating, in biographical sketches, the poetry of the conquests of science. He has a mastery of the forms of verse and a rare flexibility with his

line. Orpheus has gone down into the lower world among the dead, playing his lute and seeking his lost Eurydice:

And they that were dead, in his radiant music,
heard the moaning of doves in the olden
Golden-girdled purple pinewood; heard the
moan of the roaring sea;
Heard the chant of the soft-winged songsters,
nesting low in the fragrant golden
Olden haunted blossoming bowers of lovers
that wandered in Arcady;

Saw the soft blue veils of shadow floating
over the billowy grasses
Under the crisp white curling clouds that
sailed and trailed through the melting blue;
Heard once more the quarrel of lovers above
them pass, as a lark-song passes,
Light and bright, till it vanishes away in an
eye-bright heaven of silvery dew.

SOME MEN OF NOTE IN THE POETRY OF TO-DAY

John C. Squire, a large-minded and generous critic, has illustrated in his own poems modern developments in metrical lilt, with a direct simplicity and fine feeling. Squire has also gained wide hearing for a young poet, now dead, James Elroy Flecker, who, beginning with unproved imagination, gave signs of a romantic splendor that it was sad to lose before fulfillment. Hear his description of the sea:

The dragon-green, the luminous, the dark, the
serpent-haunted sea,
The snow-besprinkled wine of earth, the
white-and-blue-flower foaming sea.

W. B. Yeats has expressed in melodious verse the elusive charm of the Irish imagination wherein,

The fairies dance in a place apart,
Shaking their milk-white feet in a ring,
Tossing their milk-white arms in the air;
For they hear the wind laugh and murmur
and sing
Of a land where even the old are fair,
And even the wise are merry of tongue.

The pen name of Walter de la Mare represents an imaginative refinement best approached through the poet's charming Songs of Childhood. Professor A. E. Housman has won wide favor by the satisfying simplicity of A Shropshire Lad; but he has not the poetic breadth of his brother, Laurence Housman. John Drinkwater has brought poetry back to the stage with a success that looked impossible. W. H. Davies has shown how direct poetic vision of nature can find a voice in the simplest words.

The World War brought an outburst of poetry from the splendid young manhood which went forth to sacrifice. At least sixty possible poets sang their swan songs and died.

They went with songs to the battle; they were
young,
Straight of limb, true of eye, steady and
aglow;
They were staunch to the end against odds
uncounted,
They fell with their faces to the foe.

Of course Time did not allow the harvest to be matured. The name of Rupert Brooke will stand, probably, as representative of what might have been expected from these squandered lives. He wrote, as well-nigh all of them wrote, with forewarning of the end. "If I should die"—he begins, and Alan Seeger repeats, "I have a rendezvous with death." They sacrificed their lives to an ideal which they had of country and the cause of right. They kept that faith in carnage and in mud. They tried to pass it on:

To you from failing hands we throw
The torch; be yours to hold it high.

Cut short in their creative life by the furious cloud of war, Siegfried Sassoon best expresses its scorching effect on their poetic spirits:

I lived my days apart,
Dreaming fair songs for God,
By the glory in my heart
Covered and crowned and shod.

Now God is in the strife,
And I must seek Him there,
Where death outnumbers life
And fury smites the air.

I walk the secret way
With anger in my brain.
O music through my clay
When will you sound again?

It was a writer of the period we are thinking of, Arthur O'Shaughnessy, who, in his one poem that endures, states most boldly and melodiously the claim of the poets to the mightiest influence in the world.

We, in the ages lying
In the buried past of the earth,
Built Nineveh with our sighing,
And Babel itself in our mirth;
And o'erthrew them with prophesying
To the old of the new world's worth;
For each age is a dream that is dying,
Or one that is coming to birth.

THE NEXT STORY OF LITERATURE IS ON PAGE 4445.

FAMOUS BOOKS

THE STORIES OF JULES VERNE

JULES VERNE, the famous French writer of imaginative tales, was born at Nantes on February 8, 1828, and died at Amiens on March 24, 1905. He wrote a number of stories of marvelous adventures. We are to read one of his tales which involves no extraordinary inventions. The hero is an Englishman. But the author makes many comic errors. The fact that he could make an Englishman mistake a Saturday in London for a Sunday is sufficient to show how little he knew of English life. It is now possible to make the tour of the world in half the time that Phileas Fogg took. So much has the speed of railway and steamship traveling increased since the story was written, in 1873.

ROUND THE WORLD IN EIGHTY DAYS

IN the year 1872, the house at No. 7, Savile Row, London, was inhabited by Phileas Fogg, an eccentric member of the Reform Club of London. Although unmistakably an Englishman, he may not have been a Londoner. But it was certainly many years since he had been absent for any time from the daily routine of his life in London. He lived quite alone, and never had a visitor. A single servant attended to all his domestic wants. As he required of this servant a degree of punctuality and regularity almost beyond an ordinary human being, he had some difficulty in keeping even one servant.

It was October 2, and Mr. Fogg had just discharged his man because he had brought him his shaving water heated to 84° Fahrenheit instead of 86°. He now awaited the appearance of his new servant, who was due between eleven and half-past eleven. At that moment the discharged servant ushered his successor into the room. The name of the newcomer was Jean Passepartout, and he was a stout Frenchman of some thirty years.

"You have been recommended to me," said Phileas Fogg, "and I have some good testimonials concerning you. You know my conditions?"

"Yes, sir."

"Good. What is the time by your watch?" Phileas Fogg continued.

"Eleven twenty-two," replied Passepartout, drawing from the depths of his

watch-pocket an enormous silver watch.

"You are slow,"

said Mr. Fogg.

"I beg your pardon, sir, but that is scarcely possible."

"You are four minutes slow," continued Mr. Fogg; "but it does not matter so long as you know it. And now, from this moment, 11:29 A.M., Wednesday, October 2, 1872, you are in my service."

That night, as usual, Mr. Fogg was joined by several members of the club who were his particular friends.

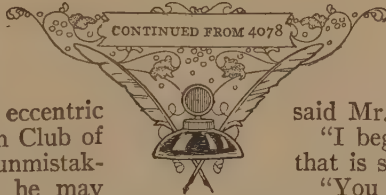
"By the way," said one of these—Flanagan, a rich brewer—"what's the latest about the robbery?" addressing Mr. Ralph, a director of the Bank of England.

"The Bank will lose its money, I fancy," remarked Mr. Andrew Stuart, the famous engineer.

"On the contrary," replied Mr. Ralph, "I hope we shall soon lay hands on the thief. As all the ports are being carefully watched, he will find it difficult to escape from the country."

While some of the gentlemen considered the world was so large that one could easily get beyond the reach of the law, Phileas Fogg maintained, in his quiet way, that the world was no longer large. The bank director agreed in thinking that the means of transit had made the world a much smaller place to live in. Thus it was that they came to discuss how long it would take to go round the earth.

CONTINUED FROM 4078



Three months was held to be the time required, but Phileas Fogg maintained that eighty days would be sufficient. Stuart, the engineer, offered to wager \$100,000 that it was impossible. Phileas Fogg asserted that he was ready to start at once, and prove that he was right.

MR. PHILEAS FOGG MAKES A WAGER OF \$100,000 IN STRANGE CIRCUMSTANCES

To show his confidence, he said he would risk \$100,000 of his fortune on the venture, staking that sum against anyone who cared to accept the wager, and agreeing to pay it over if he did not make the tour of the earth in eighty days or less. His five fellow-clubmen accepted the wager, and Mr. Fogg warned them that he would make the tour at their expense.

"Now that's settled," said Mr. Fogg. "I find that a train leaves for Dover at 8:45 to-night; I shall travel by it."

"This very evening?" exclaimed Stuart, in a tone of great surprise.

"This very evening," replied Fogg, as coolly as though it were a matter of going to the next street. Consulting his pocket calendar, he continued: "This is Wednesday, October 2. I ought to be back in the reading-room of the Reform Club on Saturday, December 21, at 8:45 P.M. In default of which the \$100,000 now lying at my bankers' will belong to you gentlemen."

By eight o'clock Passepartout had packed his employer's bag, and after carefully shutting up the various rooms he found his employer ready. Into the traveling-bag Mr. Fogg thrust an enormous bundle of bank notes, telling Passepartout to be careful of the bag, as it contained no less than \$100,000. Thus they left the house, Passepartout carrying the bag and Mr. Fogg's waterproof and traveling-rug. The front door was double locked, and crossing to the cabstand, they hired a cab and drove rapidly to Charing Cross Station. At the station the five friends of Phileas Fogg were present to see him off. He explained to them that he had a passport which he would get witnessed at every important place on his route as evidence of his journey. At 8:45 the train steamed out of the station. The journey round the world had begun.

Seven days later, while people were waiting at Suez for the arrival of the mail steamer Mongolia, two men on the quay were in earnest conversation. The

one was the British consul, and the other a thin little fellow with an intelligent but somewhat restless face, whose eyes seemed never at rest. This man was Fix, one of the many detectives sent out to the chief ports to track the author of the bank robbery, the discussion of which had led in so singular a way to Phileas Fogg's tour of the world.

MR. FOGG IS SUSPECTED, AND FIX, THE DETECTIVE, BEGINS A LONG CHASE

The Mongolia was to stop for only a short time at Suez and continue her voyage direct to Bombay. As the passengers came off they were all carefully watched by the detective. Passepartout, having been sent ashore with Mr. Fogg's passport to have it witnessed, raised his suspicions. Fix decided he would follow Mr. Fogg to Bombay, and took passage on the Mongolia.

The travelers had been only an hour or two in Bombay when Passepartout involved both Mr. Fogg and himself in serious trouble. Sent to make some purchases, he wandered into one of the great Hindu temples without having first taken off his boots. On being turned out by the priests, who forcibly removed his boots, he dealt very roughly with them before he took to his heels, followed by an angry crowd. He got to the station only a few minutes before the train was due to leave.

Passepartout occupied the same compartment as Mr. Fogg, but there was a third traveler in the opposite corner. This was Sir Francis Cromarty, a brigadier-general, who had traveled with them from Suez to Bombay, and was now on his way to take up his military command at Benares.

Early on the morning of October 22 they arrived at the end of the railway, and found that they were still fifty miles from Allahabad. Phileas Fogg had to pay \$10,000 for an elephant so that he could continue the journey. A young Parsee acted as guide, and Sir Francis was invited to go with them.

The guide, in order to shorten the distance, decided to cut across the Vindhia mountains. The mahout, or elephant-driver, urged his animal to a trot. The white men in the howdahs, as the elephant baskets are called, were much shaken.

The adventure in the jungle is now told in the words of the book.

THE RESCUE OF AOUDA

AT two o'clock the guide entered the shelter of a thick forest, which he had to traverse for a space of several miles. He preferred to travel thus under cover of the woods. At all events, up to this moment there had been no unpleasant meeting, and it seemed as if the journey would be accomplished without accident, when the elephant, showing some signs of uneasiness, suddenly stopped.

It was then four o'clock.

"What is the matter?" asked Sir Francis Cromarty, raising his head above his howdah.

"I do not know, officer," replied the Parsee, listening to a confused murmur which came through the thick branches.

A few moments after, this murmur became more defined. It might have been called a concert, still very distant, of human voices and brass instruments.

Passepartout was all eyes, all ears. Mr. Fogg waited patiently, without uttering a word.

The Parsee jumped down, fastened the elephant to a tree, and plunged into the thickest of the undergrowth. A few minutes later he returned, saying:

"A Brahmin procession coming this way. If it is possible, let us avoid being seen."

The guide unfastened the elephant, and led him into a thicket, recommending the travelers not to descend. He held himself ready to mount the elephant quickly, should flight become necessary. But he thought that the troop of the faithful would pass without noticing him, for the thickness of the foliage entirely concealed him.

The discordant noise of voices and instruments approached. Monotonous chants were mingled with the sound of the drums and cymbals. Soon the head of the procession appeared from under the trees, at fifty paces from the spot occupied by Mr. Fogg and his companions. Through the branches they readily distinguished the curious *personnel* of this religious ceremony.

In the first line were the priests, with miters upon their heads and attired in long robes adorned with gold and silver lace. They were surrounded by men, women, and children, who were singing a sort of funereal psalmody, interrupted at regular intervals by the beating of tam-

tams and cymbals. Behind them on a car with large wheels, whose spokes and felloes represented serpents intertwined, appeared a hideous statue, drawn by two pairs of richly caparisoned zebus. This statue had four arms, its body colored with dark red, its eyes haggard, its hair tangled, its tongue hanging out, its lips colored with henna and betel. Its neck was encircled by a collar of skulls, around its waist a girdle of human hands. It was erect upon a prostrate giant, whose head was missing.

Sir Francis Cromarty recognized the statue at once.

"The goddess Kali," he murmured; "the goddess of love and death."

"Of death, I grant, but of love, never!" said Passepartout. "The ugly old woman!"

The Parsee made him a sign to keep quiet.

Around the statue there was a group of old fakirs jumping and tossing themselves about convulsively. Smeared with bands of ocher, covered with cross-like cuts, whence their blood escaped drop by drop—stupid fanatics, who, in the great Hindoo ceremonies, precipitate themselves under the wheels of the car of Juggernaut.

Behind them, some Brahmins, in all the magnificence of their Oriental costume, were dragging a woman who could hardly hold herself erect.

This woman was young, and as fair as a European. Her head, her neck, her shoulders, her ears, her arms, her hands, and her toes were loaded down with jewels, necklaces, bracelets, earrings, and finger-rings. A tunic, embroidered with gold, covered with light muslin, displayed the outlines of her form.

Behind this young woman—a violent contrast for the eyes—were guards, armed with naked sabers fastened to their girdles and long damaskeened pistols, carrying a corpse upon a palanquin.

It was the body of an old man, dressed in the rich garments of a rajah, having, as in life, his turban embroidered with pearls, his robe woven of silk and gold, his sash of cashmere ornamented with diamonds, and his magnificent arms as an Indian prince.

Then, musicians and a rear-guard of fanatics, whose cries sometimes drowned

the deafening noise of the instruments, closed up the *cortège*.

Sir Francis Cromarty looked at all this pomp with a singularly sad air, and turning to the guide he said:

"A suttee!"

The Parsee made an affirmative sign and put his finger on his lips. The long procession slowly came out from the trees, and soon the last of it disappeared in the depths of the forest. Little by little the chanting died out. There were still the sounds of distant cries, and finally a profound silence succeeded all this tumult.

Phileas Fogg had heard the word uttered by Sir Francis Cromarty, and as soon as the procession had disappeared he asked:

"What is a suttee?"

"A suttee, Mr. Fogg," replied the brigadier-general, "is a human sacrifice, but a voluntary sacrifice. The woman that you have just seen will be burned to-morrow in the early part of the day."

"Oh, the villains!" cried Passepartout, who could not prevent this cry of indignation.

"And this corpse?" asked Mr. Fogg.

"It is that of the prince, her husband," replied the guide, "an independent rajah of Bundelcund."

"How," replied Phileas Fogg, without his voice betraying the least emotion, "do these barbarous customs still exist in India, and the English have not been able to extirpate them?"

"In the largest part of India," replied Sir Francis Cromarty, "these sacrifices do not come to pass; but we have no influence over these wild countries, and particularly over this territory of Bundelcund. All the northern slope of the Vindhias is the scene of murders and incessant robberies."

"The unfortunate woman," murmured Passepartout, "burned alive!"

"Yes," replied the general, "burned, and if she was not you would not believe to what a miserable condition she would be reduced by her near relatives. They would shave her hair; they would scarcely feed her with a few handfuls of rice; they would repulse her; she would be considered as an unclean creature, and would die in some corner like a sick dog. So that the prospect of this frightful existence frequently drives these unfortunates to the sacrifice much more than love or religious fanaticism. Sometimes, however, the sacrifice is really voluntary and the energetic intervention of the government is necessary to prevent it. Some years ago I was living at Bombay, when



PASSEPARTOUT WAS DRIVEN FROM THE TEMPLE WITHOUT HIS BOOTS



PASSEPARTOUT RESCUES THE RAJAH'S WIDOW FROM BEING BURNED ALIVE

a young widow came to the governor to ask his authority for her to be burned with the body of her husband. As you may think, the governor refused. Then the widow left the city, took refuge with an independent rajah, and there she finally successfully accomplished the sacrifice."

During the narrative of the general the guide shook his head, and when he was through, said:

"The sacrifice which takes place to-morrow is not voluntary."

"How do you know?"

"It is a story which everybody in Bundelcund knows," replied the guide.

"But this unfortunate did not seem to make any resistance," remarked Sir Francis Cromarty.

"Because she was intoxicated with the fumes of hemp and opium."

"But where are they taking her?"

"To the pagoda of Pillaji, two miles from here. There she will pass the night in waiting for the sacrifice."

"And this sacrifice will take place—"

"At the first appearance of day."

After this answer the guide brought the elephant out of the dense thicket and jumped on his neck. But at the moment that he was going to start him

off by a peculiar whistle Mr. Fogg stopped him, and addressing Sir Francis Cromarty, said: "If we could save this woman!"

"Save this woman, Mr. Fogg!" cried the brigadier-general.

"I have still twelve hours to spare. I can devote them to her."

"Why, you are a man of heart!" said Sir Francis Cromarty.

"Sometimes," replied Phileas Fogg simply, "when I have time."

The design was bold, full of difficulties, perhaps impracticable. Mr. Fogg was going to risk his life, or at least his liberty, and consequently the success of his plans, but he did not hesitate. He found, besides, a decided ally in Sir Francis Cromarty.

As to Passepartout, he was ready and could be depended upon. His master's idea excited him. He felt that there was a heart and soul under this icy covering. He almost loved Phileas Fogg.

Then there was the guide. What part would he take in the matter? Would he not be with the Indians? In default of his aid it was at least necessary to be sure of his neutrality.

Sir Francis Cromarty put the question to him frankly.

"Officer," replied the guide, "I am a Parsee, and that woman is a Parsee. Make use of me."

"Very well, guide," replied Mr. Fogg.

"However, do you know," replied the Parsee, "that we not only risk our lives, but horrible punishments if we are taken. So see."

"That is seen," replied Mr. Fogg. "I think that we shall have to wait for night to act?"

"I think so too," replied the guide.

The brave Hindoo then gave some details as to the victim. She was an Indian of celebrated beauty, of the Parsee race, the daughter of a rich merchant of Bombay. She had received in that city an absolutely English education, and from her manners and cultivation she would have been thought a European. Her name was Aouda.

An orphan, she was married against her will to this old rajah of Bundelcund. Three months after she was a widow. Knowing the fate that awaited her, she fled, was retaken immediately, and the relatives of the rajah, who had an interest in her death, devoted her to this sacrifice from which it seemed she could not escape.

This narrative could only strengthen Mr. Fogg and his companions in their generous resolution. It was decided that the guide should turn the elephant toward the pagoda of Pillaji, which he should approach as near as possible.

A half-hour afterward a halt was made under a thick clump of trees, five hundred paces from the pagoda, which they could not see, but they heard distinctly the yellings of the fanatics.

The means of reaching the victim were then discussed. The guide was acquainted with the pagoda in which he asserted that the young woman was imprisoned. Could they enter by one of the doors, when the whole band was plunged into the sleep of drunkenness, or would they have to make a hole through the wall? This could be decided only at the moment and the place. But there could be no doubt that the abduction must be accomplished this very night, and not when, daylight arrived, the victim would be led to the sacrifice. Then no human intervention could save her.

Mr. Fogg and his companions waited for night. As soon as the shadows fell, toward six o'clock in the evening, they determined to make a reconnaissance

around the pagoda. The last cries of the fakirs had died out. According to their customs, these Indians were plunged in the heavy intoxication of "bhang," liquid opium mixed with an infusion of hemp, and it would perhaps be possible to slip in between them to the temple.

The Parsee guiding, Mr. Fogg, Sir Francis Cromarty, and Passepartout advanced noiselessly through the forest. After ten minutes' creeping under the branches they arrived on the edge of a small river, and there by the light of iron torches, at the end of which was burning pitch, they saw a pile of wood. It was the funeral pile, made of costly sandalwood, and already saturated with perfumed oil. On its upper part the embalmed body of the rajah was resting, which was to be burned at the same time as his widow. At one hundred paces from this pile rose the pagoda, whose minarets in the darkness pierced the tops of the trees. "Come," said the guide in a low voice.

Soon the guide stopped at the end of a clearing, lit up by a few torches. The ground was covered with groups of sleepers, heavy with drunkenness.

In the background, among the trees, the temple of Pillaji stood out indistinctly. But to the great disappointment of the guide the guards of the rajahs, lighted by smoky torches, were watching at the doors, and pacing up and down with drawn sabers. Phileas Fogg and Sir Francis Cromarty understood as well as himself, that they could attempt nothing on this side. They stopped and talked in a low tone.

"Let us wait," said the brigadier-general, "it is not eight o'clock yet, and it is possible that these guards may succumb to sleep."

"That is possible indeed," replied the Parsee.

Phileas Fogg and his companions stretched themselves out at the foot of a tree and waited.

They waited thus until midnight. The situation did not change. The same watching outside. It was evident that they could not count on the drowsiness of the guards.

After a final conversation the guide said he was ready to start. Mr. Fogg, Sir Francis, and Passepartout followed him. They made a pretty long detour, so as to reach the pagoda by the rear.

About a half-hour past midnight they

arrived at the foot of the walls without having met any one. No watch had been established on this side, but windows and doors were entirely wanting.

But it was not sufficient to reach the foot of the walls; it was necessary to make an opening there. For this operation Phileas Fogg and his companions had nothing at all but their pocket-knives. Fortunately the temple walls were composed of a mixture of bricks and wood, which could not be difficult to make a hole through. The first brick once taken out the others would easily follow.

They went at it, making as little noise as possible. The Parsee from one side, and Passepartout from the other, worked to unfasten the bricks, so as to get an opening two feet wide.

The work was progressing, but—unfortunate mischance—some guards showed themselves at the rear of the pagoda and established themselves there so as to hinder an approach.

It would be difficult to describe the disappointment of these four men, stopped in their work.

"What can we do but leave?" asked the general in a low voice.

"We can only leave," replied the guide.

"Wait," said Fogg. "It will do if I reach Allahabad to-morrow before noon."

"But what hope have you?" replied Sir Francis Cromarty. "It will soon be daylight, and—"

"The chance which escapes us now may return at the last moment."

The general would have liked to read Phileas Fogg's eyes.

What was this cold-blooded Englishman counting on? Would he, at the moment of the sacrifice, rush toward the young woman and openly tear her from her murderers?

That would have been madness, and how could it be admitted that this man was mad to this degree? Nevertheless, Sir Francis Cromarty consented to wait until the *dénouement* of this terrible scene. However, the guide did not leave his companions at the spot where they had hid, and he took them back to the foreground of the clearing. There, sheltered by a clump of trees, they could watch the sleeping groups.

In the meantime, Passepartout, perched upon the lower branches of a tree, was meditating an idea which had first crossed

his mind like a flash, and which finally imbedded itself in his brain.

He had commenced by saying to himself, "What madness!" and now he repeated, "Why not, after all? It is a chance, perhaps the only one, and with such brutes—"

At all events Passepartout did not put his thought into any other shape, but he was not slow in sliding down, with the ease of a snake, on the lower branches of the tree, the end of which bent toward the ground.

The hours were passing, and soon a few less somber shades announced the approach of day. But the darkness was still great.

It was the time fixed. It was like a resurrection in this slumbering crowd. The groups awakened up. The beating of tam-tams sounded; songs and cries burst out anew. The hour had come in which the unfortunate was to die.

The doors of the pagoda were now opened. A more intense light came from the interior. Mr. Fogg and Sir Francis could see the victim, all lighted up, whom two priests were dragging to the outside. It seemed to them that, shaking off the drowsiness of intoxication by the highest instinct of self-preservation, the unfortunate woman was trying to escape from her executioners. Sir Francis' heart throbbed violently, and with a convulsive movement seizing Phileas Fogg's hand, he felt that it held an open knife.

At this moment the crowd was agitated. The young woman had fallen again into the stupor produced by the fumes of the hemp. She passed between the fakirs, who escorted her with their religious cries.

Phileas Fogg and his companions followed her, mingling with the rear ranks of the crowd.

Two minutes after, they arrived at the edge of the river, and stopped less than fifty paces from the funeral pile, upon which was lying the rajah's body. In the semi-obscurity they saw the victim, motionless, stretched near her husband's corpse.

Then a torch was brought, and the wood, impregnated with oil, soon took fire.

At this moment Sir Francis Cromarty and the guide held back Phileas Fogg, who in an impulse of generous madness was going to rush toward the pile.

But Phileas Fogg had already pushed them back, when the scene changed suddenly. A cry of terror arose. The whole crowd, frightened, cast themselves upon the ground.

The old rajah was not dead, then; he was seen suddenly rising upright, like a phantom, raising the young woman in his arms, descending from the pile in the midst of the clouds of smoke which gave him a spectral appearance.

The fakirs, the priests, overwhelmed with a sudden fear, were prostrate, their faces to the ground, not daring to raise their eyes and look at such a miracle!

The inanimate victim was held by the vigorous arms carrying her, without seeming to be much of a weight. Mr. Fogg and Sir Francis had remained standing. The Parsee had bowed his head, and Passepartout, without doubt, was not less stupefied.

The resuscitated man came near the spot where Mr. Fogg and Sir Francis Cromarty were, and said shortly:

"Let us be off!"

It was Passepartout himself, who had slipped to the pile in the midst of the thick smoke. It was Passepartout who, profiting by the great darkness still prevailing, had rescued the young woman from death! It was Passepartout who, playing his part with the boldest good luck, passed out in the midst of the general fright!

An instant after the four disappeared in the woods, and the elephant took them onward with a rapid trot. But cries, shouts, and even a ball, piercing Phileas Fogg's hat, apprised them that the strata-gem had been discovered.

Indeed, on the burning pile still lay the body of the old rajah. The priests, recovered from their fright, learned that the abduction had taken place.

They immediately rushed into the forest. The guards followed them. Shots were fired; but the abductors fled rapidly, and in a few moments they were out of range of balls or arrows.

We must leave Jules Verne's own words, to finish the tale in a page or two.

The guide knew all the secrets of the forest, and forced the elephant to the height of its pace. So by ten o'clock they were at Allahabad, where the railway journey was resumed to Calcutta. By seven o'clock in the morning Calcutta

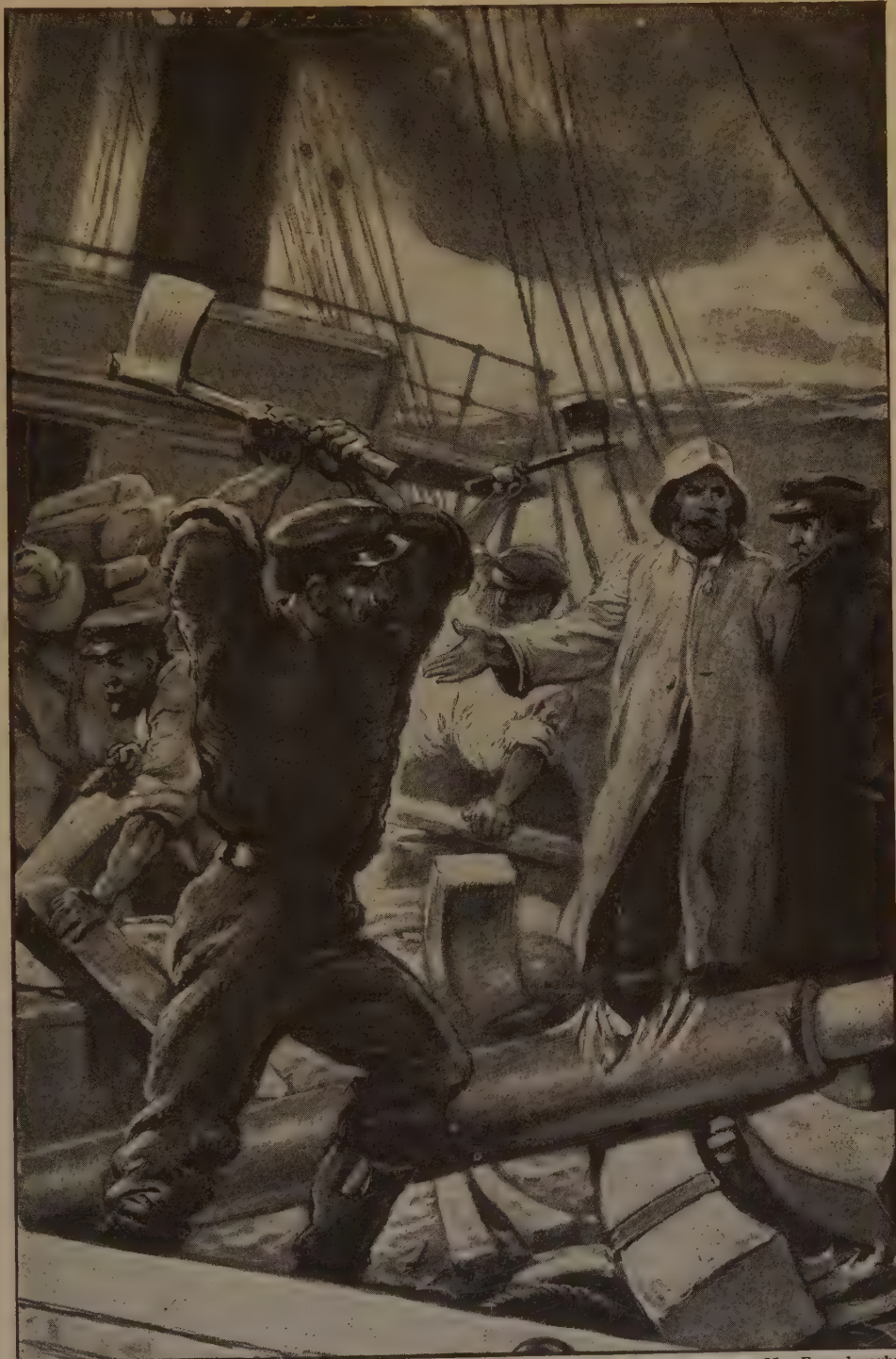
had been reached. As the mail-boat for Hongkong would not weigh anchor till noon, Mr. Fogg had still five hours before him. In Calcutta Fix had Passepartout and his master arrested for the trouble in the Bombay temple. Mr. Fogg at once paid bail of \$10,000 and was able to catch the steamer. Fix was furiously angry and followed them to Hongkong.

At Hongkong Passepartout was enticed by Fix into an opium den, so Phileas Fogg missed the regular mail-steamer to San Francisco. He, with Aouda, hiring a brigantine, caught the steamer as it was leaving Shanghai. The vessel called at Yokohama, and there Fogg rescued Passepartout, who had joined a troupe of circus performers. San Francisco was reached on December 3. There Fix boldly appeared, pretending that the meeting was one of chance. The unsuspecting Mr. Fogg permitted the detective to join his party for the train journey across the United States. The train was attacked by Indians, but Passepartout's heroism saved the lives of the passengers. Unfortunately the little Frenchman was captured by the savages. Mr. Fogg immediately started a rescue party out. Passepartout was brought back in safety. But the delay made Phileas Fogg miss the Liverpool steamer by forty-five minutes.

There was nothing for it but to hire a boat, and this was no easy matter. Not until he had offered the captain of a steamer \$8,000 to take himself and his three companions to Bordeaux, where the steamer was bound, could he get away from New York. But, of course, he did not wish to go to Bordeaux, and when they had been at sea some days Mr. Fogg had to take the extreme measure of bribing every member of the crew. Then he imprisoned the captain and assumed command himself, for it now appeared that he was a practiced navigator.

They had got to within 770 miles of Liverpool when the coal entirely gave out, and Mr. Fogg brought the captain to reason by the simple process of buying the vessel from him at \$60,000, which was much above its value. He then gave orders to burn the masts, and so they went along, tearing up all the woodwork to feed the furnaces, until, when they arrived at Queenstown, the vessel was only a fragment of what it had been. But Mr. Fogg presented it to the captain, and left him on friendly terms.

THE STEAMSHIP THAT CONSUMED ITSELF



When nearly eight hundred miles from the coast of England the coal supply gave out, so Mr. Fogg bought the steamer for \$60,000, and ordered the crew to cut down the masts and woodwork to feed the furnaces.

MR. FOGG ARRESTED AT LAST, AND WHY HE THOUGHT HE HAD LOST HIS WAGER

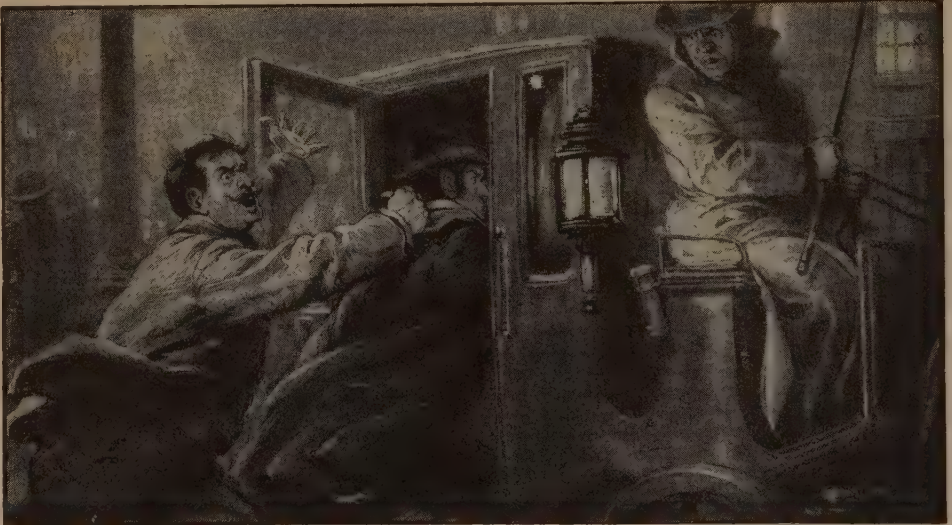
Train to Dublin and steamer to Liverpool left him only six hours to do the journey from the Mersey port to London. It would have been sufficient; but, as he stepped on the quay at Liverpool, Fix, the detective, laid his hand on his shoulder, and showing the order of arrest, said: "I arrest you in the Queen's name!"

So off to prison was Mr. Fogg hurried, and he had been there two hours before Passepartout and Aouda arrived in company of Fix, the latter out of breath and his hair wildly disordered, to announce that it was all a mistake, as the real bank-robber had been arrested. Mr. Fogg said not a word, but with automatic

sate him for his disappointment. So next day Passepartout was dispatched to interview the parish clergyman of Marylebone and make arrangements for the marriage. When he returned he was breathless with excitement. The clergyman had said it was impossible to arrange anything, to-morrow being Sunday.

"To-day Saturday! Impossible!" exclaimed Mr. Fogg. "To-day is Sunday, and to-morrow Monday!"

"But no," persisted Passepartout; "you have made a mistake of a whole day! We have arrived twenty-four hours in advance of our time, but you have only ten minutes now to spare to get to the club." Phileas Fogg was able to enter the reading room at the club at a quarter to



PASSEPARTOUT SEIZED HIS MASTER BY THE COLLAR AND HURRIED HIM TO A CAB

precision lifted his hand and struck the stupid detective to the ground. He walked away with Aouda and Passepartout, hired a carriage to the station, commanded a special train to London, and arrived there as the fingers of the station clock showed ten minutes to nine. He was five minutes late and had lost his wager!

Not only had poor Phileas Fogg lost his wager, but he had wasted his fortune. It was therefore left to Aouda to propose that if he were now to be a poor man he required someone to comfort him, and as he had been the means of saving her life, and had perhaps for that reason lost his wager, she should be his comforter. Mr. Fogg felt that this would be a most desirable arrangement and would compen-

nise precisely. He had won his wager of \$100,000, and his friends were there waiting for him, as they had arranged eighty days before.

And how was it possible for so exact a man as Phileas Fogg to make a mistake of twenty-four hours in his calculations? Simply because he had not allowed for the time gained on a journey made continually in an easterly direction.

While Mr. Fogg was traveling eastward, he saw the sun at its meridian, which means directly overhead, eighty times, while his friends who remained in London had seen it only seventy-nine times.

There is nothing more to tell except that the charming Aouda, in due course, made Mr. Fogg the happiest of men.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 4319.



Photo, Boland.

Timbers on the way to the mill at Tacoma.

SOME IMPORTANT TIMBER TREES

TREES are planted and grown for various reasons. In parks and gardens they are cultivated for ornament, and certainly no landscape can be called perfect without trees; in orchards and gardens trees are grown for their fruits, and thousands of square miles are given up to the cultivation of oranges, lemons, apples, pears, plums, cherries and nuts.

But it is as sources of timber that we generally think of trees, and this is indeed their chief use, for men have found no satisfactory substitute for some of the uses of wood. All countries except the extreme North and the desert areas, and to some extent the rolling prairies, have their timber trees. In practically every country where trees grow man has made use of the timber in some form or other, even if only to make dug-out boats.

The timber trees of the world may be divided roughly into two classes—the needle-leaved and the broad-leaved. The needle-leaved class are the conifers, whose leaves are shaped like needles; and the broad-leaved class includes all the other trees, such as the oak, elm, walnut, hornbeam, teak and mahogany. Another division sometimes made is into softwood and hardwood trees. Read all the tree articles

CONTINUED FROM 4108



in Volumes Eleven, Twelve and Thirteen, and you will learn much about the many trees of our land.

Prominent among the broad-leaved varieties stands the majestic Oak, hallowed especially by many historic associations from very early times. It is found all over Europe and in America, Asia and Africa. Altogether there are about three hundred species of oaks. The principal European species is *Quercus robur*. This is the oak of which we have read so many times in English history and literature. It is the only native oak of Great Britain, and is highly valued for timber. In Anglo-Saxon times it was more valued for its acorns, which furnished the principal food for hogs, and when other food was scarce were eaten by man. This oak may grow as high as a hundred feet, but this height is rare. The wood is almost everlasting, unless it is attacked by insect pests. It is estimated that fifteen hundred different species may attack some part or other of the tree.

The most important American oak is the White Oak (*Quercus alba*), which grows from Canada to the Gulf of Mexico and westward to Texas. The timber is excellent, though perhaps not so durable as that of the European oak. It is described on page

4642. The chief western oak is the Bur Oak (*Quercus macrocarpa*). The Red Oak and the Scarlet Oak also furnish valuable timber. The Western Oak (*Quercus Garryana*) is found only on the Pacific coast and is a valuable timber tree. The Chestnut Oak (*Quercus prinus*) has much tannin in its bark, and the timber is also used for many purposes. The Pin Oak (*Quercus palustris*) is a beautiful tree.

These are not all of the fifty species of oaks of North America, but we have room to speak of but one more, the Live Oak (*Quercus virginiana*), which belongs to the South, though there is another species on the Pacific coast. This is *Quercus agrifolia*, and is an attractive shade tree.

THE LIVE OAK, WHICH GROWS NEAR THE SEA

A visitor to the seacoast in the South is sure to ask what this great spreading tree may be which has such hard shiny oval leaves. The hundreds of old acorns beneath the tree will tell him that it is an oak, but the leaves are very different from the thin broad kind he has known on other oaks. He will find much to interest him in this sturdy evergreen tree which is found in the sandy soils close to the ocean.

Because this tree is green the year round it has been long known as the "live oak." Its leaves are thick and hard, and it can survive and grow in sandy places where the water soon sinks away, and where the wind is so strong that other plants with thinner and broader leaves cannot live. Especially interesting, however, are those solitary trees seen on greatly exposed shores, whose struggle with the wind has been only partly successful. On the seaward side the wind is steadily killing the branches, while on the opposite side, protected somewhat by the mass of dead branches, the twigs are still growing. Such a tree literally grows sideways rather than up after the branches are draped with Spanish moss. The timber is excellent, but hard to work.

THE MANY ELMS USED FOR TIMBER

Next to the oak may be mentioned the Elm, the very stately relative of the hop and the nettle, the fig and the mulberry. It grows ordinarily to a height of from fifty to seventy feet, though some species may, in favorable circumstances, reach a

hundred feet or even more. Often its girth is from ten to twenty feet, but sometimes it has been known to exceed fifty. No more beautiful tree is seen in a landscape, and artists like Constable have made much use of it in their pictures.

There are fifteen or sixteen species of elm, all living in the north temperate zone. The common European Elm (*Ulmus campestris*) is often called the English Elm because it grows best in southern England. It is a beautiful tree, more compact than most of our native elms, and has been widely planted as an ornamental tree in America. The wood is hard and is much prized. If kept dry or in water it is durable, but it decays in a damp situation. Another European elm, the Scotch, or Wych, Elm (*Ulmus montana*), has also been planted in America as an ornamental tree. In Europe the wood is used by boat-builders.

We are so proud of the size and beauty of the American Elm (*Ulmus americana*) as it grows in our streets and lawns that we seldom think of it as a timber tree. However, a considerable quantity of elm wood is used by coopers and wagon-makers. The elms for which New England and Canada are famous are of this species, but they grow everywhere east of the Rockies. There is a good picture on page 4516. Unfortunately many of the finest elms in New England have been killed by the caterpillars of the brown-tailed moth, a pest imported from Europe.

Other elms valuable for timber are the Red, or Slippery, Elm (*Ulmus fulva*) and the Rock, or Cork, Elm (*Ulmus racemosa*). The wood of both of these is better than that of the more common American elm, and the bark of the first-named furnishes also a sort of mucilage used in medicine.

The Hornbeam, a European tree, grows well in the poorest soil. It is often mistaken for the beech, which it closely resembles, though the leaves have not that glossy appearance characteristic of the beech. The hornbeam leaf is double-toothed at the edge. The wood is particularly hard and tough, and is much used for the cogs of mill-wheels, and in making agricultural implements. It has been introduced into this country, but is not very important as a timber tree here. The American Hornbeam is a different species and does not grow so large, but the wood is very hard.

THE BEECH AND ITS STRANGELY SHAPED TRUNK

The Beech is a fine-looking tree which many think takes precedence for grace and nobility over all other trees. The only American Beech (*Fagus americana*) and the European Beech (*Fagus sylvatica*) are much alike. There are other beeches in Asia and in the south temperate zones. The trunk of our beech assumes fantastic forms, with strange knobs and hollows, sometimes giving a close resemblance of a human head or an animal's face. The smooth olive-gray bark is generally covered with lichens and moss of various shades and colors. In autumn the leaves turn a rich orange-yellow which gives a very beautiful appearance to the landscape. In a favorable situation the beech will often grow as large as an oak and reach a height of a hundred feet, with a circumference of thirty-six feet.

The wood is reddish white or light brown in color, and is largely employed in chair-making. Engineers like it for piles and works under water as, like the elm, if kept wholly submerged, it lasts for a very long time. When kept perfectly dry it also lasts well. Owing to its useful property of not absorbing water easily, it is much used on the Continent for making sabots—wooden shoes.

THE DAINTY BEAUTY OF THE "LADY OF THE WOODS"

If the oak and beech and elm are stately, the Birch is wonderfully graceful, and the poet Coleridge happily called it the "Lady of the Woods." The silvery whiteness of the bark, the slender form of the tree, the smallness of the leaves, and the feathery nature of the branches give the birch a fairy-like appearance that adds to the beauty of any place where it grows. It is not easy to associate such a dainty tree with the harsh use

to which its twigs were once put in schools.

There are about thirty species of birch, and the poet's description does not fit them all. He was referring to the White Birch of Europe (*Betula alba*). This tree is sometimes fifty feet tall and seldom grows to be eighteen inches in diameter. The wood is light brown and is used chiefly for cabinet-work and chair-making. An oil from the bark gives the pleasant odor of Russia leather. Our White Birch (*Betula populifolia*) is not so attractive, and its wood is little used.

Of our dozen birches the most valuable are the Canoe, or Paper, Birch (*Betula papyrifera*), the Yellow Birch (*Betula lutea*) and the Red, or Black, Birch (*Betula nigra*).



On the side toward the sea this live oak is dead, but the tree is so tenacious of life that some of the branches are still green.

The Indians knew how to use the bark of the Paper Birch for canoes and as covering for their wigwams. Ernest Thompson Seton calls it the "White Queen of the Woods." The tough wood of the Yellow Birch is used in shipbuilding and for furniture, but as a timber tree the Black Birch is

more valuable. It is the largest of our birches. The Cherry Birch, or Sweet Birch (*Betula lenta*), is called the Black Birch in some sections. This has beautiful wood. Birch beer is made of its sap, and a fragrant oil is extracted from its leaves. The Indians dried the inner bark and boiled it with fish or meat.

THE USEFUL ASH, WHICH THRIVES IN ALMOST ANY SOIL

Among timber trees a very high place is held by the Ash, which grows from thirty to fifty feet high, with a girth of from five to six feet. While it prefers a rich loam, it thrives in almost any soil. It is related to the olive, the lilac and the privet, and is a very elegant tree. The toughness and elasticity of its wood combined with lightness make it eminently suited to the wheelwright and agricultural-

implement maker, and for the manufacture of boat-oars, ax-handles and spade-handles, alpenstocks, and so on. The ash can always be recognized in spring by the blackness of its buds.

Many species of ash are found in America, Europe, Asia and Africa. The Common Ash of Europe (*Fraxinus excelsior*) is one of the most valuable timber trees. The wood of our White Ash (*Fraxinus americana*) is quite as good and is much prized. Baseball-bats are made of ash, and many other athletic implements also. The wood of the Black Ash (*Fraxinus nigra*) is used for much the same purposes and also for baskets. The wood of the Red Ash is not so good. The Oregon Ash, which grows along the Pacific coast, is a beautiful tree and furnishes excellent timber. We have also a Blue Ash and a Green Ash.

THE MANY MAPLES, NATIVE AND IMPORTED

There are many species of Maples. Some authorities give nearly a hundred, but others class some of these as varieties only. The tree belongs to the north temperate zone, and especially to the Far East. North America has eight or nine species. The most valuable, from every standpoint, is the Sugar Maple (*Acer saccharum*), about which we tell you on page 4511. The wood is excellent for floors, furniture and fuel; the sap makes maple-syrup and maple-sugar; and there is no finer shade tree. The Black Maple is now often classed as a variety of the Sugar Maple, and not as a special species.

We have the Silver Maple, the Red Maple, the Oregon Maple (all good timber trees), besides a number of shrubs which have little value for timber. The Box Elder (*Acer negundo*) is a true maple. In addition, many maples have been imported as ornamental trees, but none is common enough to make it important as a timber tree.

In Europe the Sycamore Maple (*Acer pseudo-platanus*) is a handsome tree sixty or seventy feet high, and the yellowish white wood is even more prized by cabinet-makers than that of its relative the common maple. The tree is called sycamore because it was at one time wrongly supposed to be the same tree as the sycamore fig of Palestine, the tree into which Zacchæus climbed, as described in St. Luke's Gospel. It has been widely planted in America, but generally

does not do well. The tree we call sycamore, or buttonwood, is a plane.

THE DARK WOOD OF THE WALNUT WHICH YOU KNOW

The Walnuts would be important timber trees if there were more of them. We have four native species. The Black Walnut (*Juglans nigra*) was once rather common, but the early settlers cut down so many of them that they are now rather scarce. The close-grained brown wood is used for gunstocks, furniture, interior woodwork in houses and in ships, and brings a high price. There is a picture on page 4637. Its nuts are delicious.

The White Walnut, or Butternut (*Juglans cinerea*), has become rare. (See page 4512. The California Walnut and the Southwestern Walnut are also found in the West. The so-called English Walnut (*Juglans regia*) really came from Persia. It has been widely planted in America, and great groves may be found in California. Few of these trees are cut for lumber, as their nuts are too valuable.

Closely related to the walnuts are the Hickories, which are found wild only in North America, though because of the value of their timber they have been planted in European forests. Twelve species are recognized. The wood of all is valuable, but the Shell, or Shag, Barks are the most common. The wood is used where it is subjected to strain, as in the running-gear of vehicles, handles for implements, and so on. The Pecan is also classed as a hickory. This tree is too valuable to cut.

The Chestnut (*Castanea dentata*) has been one of our most valuable timber trees, but a stubborn blight, probably introduced from China, seems to be killing the few trees the lumbermen have left. Chestnut wood is light but durable, and is used for furniture and fencing. Both the European Chestnut (*Castanea vulgaris*) and the Japanese Chestnut (*Castanea japonica*) have been introduced, but are not common.

While small quantities of lumber are obtained from many other broad-leaved trees, we can mention only the Gums, described on page 4510, and the Tulip tree, or Yellow Poplar (*Liriodendron tulipifera*), described on page 4508. It would be proper to place both of these among the ornamental trees. The tulip tree is one of the finest of all trees.

SOME FOREIGN TREES WITH VALUABLE WOOD

Now we may speak of some foreign trees affording excellent wood. Mahogany, when it is good, is one of the most valuable of woods, and as much as five thousand dollars has been paid for a single log for cutting up into veneers. It is a West Indian and South American timber. There are several trees from which the wood called mahogany is obtained, but the true mahogany tree is the *Swietenia*, or Spanish Mahogany. The tree grows perfectly straight to a height of ninety or a hundred feet, and provides large logs. It grows most abundantly on the coast of Honduras, and from there the best mahogany comes.

One of the most valuable timbers known is Teak, which comes from an Indian tree related to our common vervain. It is a very widely distributed tree, growing in central and southern India and Burma, and from its southern limit in Java for over two thousand miles, to the 23° North Latitude. The best and most extensive forests are in Burma. The tree reaches the height of a hundred feet or more, and has oval leaves. Teak is used for building wooden ships and for masts, for bridges, and railway carriages, for furniture and for shop-fronts. The leaves yield a red dye.

The Jarrah, or Australian Mahogany, is one of the *Eucalyptus* group of trees, and is a native of Australia, where it grows in abundance. It has a light-colored bark which has given the tree the name of Yellow Jacket. The wood is hard and very much like mahogany, and is durable if kept dry.

THE MANY TREES OF THE GREAT PINE FAMILY

So far we have spoken of the broad-leaved trees, most of which shed their leaves in the fall. Now we come to the conifers, or cone-bearing narrow-leaved trees, most of which do not shed their leaves at one time, and hence are called evergreens. However, the tamaracks and one of the cypresses shed their leaves in autumn, and some of the broad-leaved trees bear cones. The botanist distinguishes them by the fact that their seeds are naked. The name *Gymnosperm* means "naked seed." Included in the great Pine Family are the pines proper, hemlocks, spruces, firs, sequoias, cypresses, cedars and junipers.

There are about eighty species of Pines, and more than half of them are found in North America. To describe them all would require more space than we can give. The most important are the White Pine (page 4637), the Longleaf Pine, the Shortleaf Pine, the Yellow Pine and the Pitch Pine, and the Red, or Norway, Pine of the East; and in the West are the Sugar Pine, the Mountain Pine, the Rocky Mountain White Pine and the Western Yellow Pine. The Gray Pine is found north to the Arctic Circle. The wood of the last-named is not good, but in the region where it grows there is little other.

The wood of some of these pines is soft and white. In others it is dark, hard and full of resin. In the past pine has been so abundant and so cheap that it has been used more than any other wood, but the supply is no longer so abundant.

THE SPRUCES, THE FIRS AND THE HEMLOCKS

North America has seven of the known species of Spruce, and some of them are valuable timber trees. The wood is light and strong and is used in making airplanes, musical instruments and the like, but now most of the wood goes to the paper mills. In the East are the White, Black and Red Spruces. The Tideland Spruce and Engelmann's Spruce are the most valuable western spruces. The spruces are more valuable for pulp than for timber.

Closely akin to the spruces are the Firs. The two Balsam firs of the East are worth little for timber, but in the West are several valuable species. The Red Fir is a magnificent tree, but its wood is coarse and weak. The Noble Fir, and two trees both called White Firs, are also found on the mountainsides.

One of the finest timber trees of the West is the Douglas Fir, or Douglas Spruce, which often towers more than three hundred feet. It furnishes large quantities of beautiful lumber. Much of it is marketed under the name Oregon Pine.

Several species of Hemlocks are cut to a limited extent, but there are other more important conifers. It is not always realized that the Sequoias belong to this group. There are two species *Sequoia gigantea*, the Big Trees of California, and *Sequoia sempervirens*, the Redwood.

The wood of the Big Tree is valuable only because there is so much of it, but the wood of the Redwood is excellent, and is much used.

Though there are no true Cedars in the New World, half a dozen or more trees are called by that name. One, the Canoe Cedar (*Thuja occidentalis*), is an arbor vitæ; the White Cedar of the South is a cypress; and the common Red Cedar of the East, which furnishes wood for our pencils, is a juniper. Now let us end our list of American timber trees with one of the most interesting of all.

Like a pine tree, the Cypress bears a cone which puts it into the Pine Family, but in numerous other ways it is very different from a pine. The trunk widens prominently at the base, so that the tree appears to be well braced; the bark is thin and rather smooth; the leaves are very small (a half inch long) and are arranged on opposite sides of slender twigs. Late in the fall these are cut off so that this tree

loses not only its leaves in winter, but also the end twigs on which the leaves are borne. But especially to be noticed are the queer "knees" which, like a flock of youngsters, come up around the base of the tree. They are, however, not young trees at all, but merely post-like upgrowths from the roots. They bear at their tops a lot of soft bark through which necessary oxygen from the air may slowly filter to sustain life. Plants, like men, must have air if they are to live.

The cypress swamps are not very attractive to those who fear dark and gloomy places. The water out of which the trees rise up is as dark as black coffee. The hummocks here and there, when one steps on them, show the soil to be of a soft, black, mucky kind in which one would not care to be mired. Numerous shrubs and small trees are often present which make the swamp

even darker and more jungle-like. The poisonous water-moccasin snake may be frequently seen crawling among the lower branches or swimming stealthily through the black water. All in all, a cypress swamp is about the most forbidding kind of forest one can find anywhere in the United States.

HOW MUCH VALUABLE LUMBER HAS BEEN WASTED

A century ago North America had more valuable lumber trees than any other continent. In fact, there were so many that the settlers looked upon them almost as enemies to be cut down and got out of the way. Hundreds of thousands of fine trees were cut down, piled into heaps and burned.

When the lumbermen went into the forests they were generally careless. They used only the best parts of the trees, and the remainder was left to rot on the ground. Forest fires have destroyed the trees on many thousand acres both in Canada and the United States, causing

the loss of thousands of lives and millions of dollars. Now the end of some species of hardwoods is in sight, so far as use for timber is concerned.

Since the population of the United States is so much larger than that of Canada, of course destruction has been greater, but even Canada has not much hardwood left for export, though her forests of conifers are still large. It is estimated that the United States is using up timber three or four times as fast as it grows. In Canada the difference is not so great, but the Canada Year Book says that wood is being used up faster than it is growing. Fortunately in both countries something is being done to restore the forests, but trees take a long time to grow, and few owners of land will take the trouble to plant trees for their grandchildren to cut.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4381.



In the depths of a cypress swamp.

THE WIDE-SPREADING BEECH TREE



The flowers of the beech are like tassels on the ends of strings, and the nuts are good to eat.



The beech leaves, that blaze in the autumn sun, were formerly much used for stuffing beds.



The beech is one of the most beautiful trees in our woods. In Europe beeches are sometimes grown as a protection for other growing trees, but in this country it is found that they will crowd out other trees, as their thick foliage and wide-spreading branches keep out the sunlight. It is easy to find the beech tree by its smooth gray bark, and oblong heavily veined leaves.

THE TALL AND STATELY ELM TREE



The leaves of the elm are covered with hairs which may sting the skin like the nettle, though less severely. The elm is related to the nettle.



Elm flowers grow, not in catkins, but in little red tufts.



The oak tree is scarcely more stately than the elm, which also grows to a great age. Its wood is hard and of great value for building purposes. The tree in this picture is an English elm often planted in our cities and towns. The more graceful American elm is shown on page 4516.

THE OAK, THE HERCULES OF THE FOREST



The green tassels we see on oak trees are the staminate flowers. It is from the smaller pistillate flowers that acorns come.



We all know the wavy leaves of the oak, which are often attacked by insects. It is said that over 1,500 kinds of insects feed upon the oak.



There are nearly three hundred different oaks, of which about fifty are American. This is the European oak of which we read so much in English poetry. We may compare it with the white oak of America, which has a fine dome-like head. Page 4642 tells us of the white oak. A dozen other oaks are mentioned in the story, and in the two articles on American trees in this volume and the next.

THE WALNUT, "THE FOOD OF THE GODS"



These long catkins are the staminate flowers of the walnut. The pistillate flowers are small and insignificant. Three are on the lower shoot.



The leaf is divided into spear-like leaflets. In Germany no young farmer used to be allowed to marry until he had planted some walnut trees.



The tree which bears the walnut of commerce, called the Persian walnut, French walnut or English walnut, came, as we can tell by its names, from the East through Europe. It grows freely in California, especially if it is grafted on a native species. Its wood has a fine grain and is used for furniture.

THE BIRCH, THE LADY OF THE WOODS



The birch is one of our most common forest trees. Its leaves are small, and vary in shape.



The flowers, in the form of hanging catkins, are full-grown in April, and are dark crimson.



The birch thrives in extremes of heat and cold. From its graceful appearance it has been called "the lady of the woods." English boys know the use to which the twigs were formerly put in British schools, where "birching" still means whipping. This is the European white birch.

THE COMMON EUROPEAN MAPLE



When Tennyson wrote of the maple that it would "burn itself away," he referred to the leaves, which change to red or yellow in October.



The greenish yellow flowers are quite small, and develop into curious winged seeds known as "keys." These become crimson and brown.



The beauty in form and foliage of the maples, their fine color in autumn, and their rapid growth, make them a favorite shade tree for streets and lawns; besides this the sugar maple yields us nutty brown sugar, and the wood is excellent for furniture. The sugar maple is shown on page 451.

THE HARD HORNBEAM OF THE FOREST



The rough, toothed leaves of the hornbeam turn orange and scarlet in the autumn. The tree is found in marshy places and along streams.



The flowers of the hornbeam are in the form of catkins and are pale yellowish in color. The staminate and pistillate flowers are quite different.



The hornbeam is a common tree, but many people mistake it for the beech. The tree in winter is shown on page 4639. As a matter of fact, the leaves, the flowers and the trunk are all different from those of the beech. The hornbeam is so named because of the toughness of the wood.

THE ASH, THE VENUS OF THE WOODS



Cattle and horses like ash leaves, but it is said that if cows eat them the milk does not make good butter. They come late and fall early. The flowers, which come before leaves, are unattractive.



The ash is wonderful in grace and strength, and merits its title, "the Venus of the woods." This is the European ash. There are many varieties in America. An American ash is shown on page 4509.

THE CHESTNUT, THE FOOD OF THE POOR



The glossy leaves of the Spanish chestnut, which are nine or ten inches long, change in autumn from a rich green to a golden yellow, and then to brown, and when they fall they improve the soil. The yellow flowers are small, but striking, as they grow together. Their odor is offensive to many people.



The Spanish chestnut, also called the sweet chestnut, is the tree from which we get the nuts for roasting. In parts of Italy poor people eat chestnuts instead of bread. Chestnut trees grow to a great age. They are closely related to the North American chestnuts, among which is the chinquapin.

THE NORWAY SPRUCE TOWERS HIGH



We can see something familiar in this branch of spruce, for it is often used for Christmas trees.

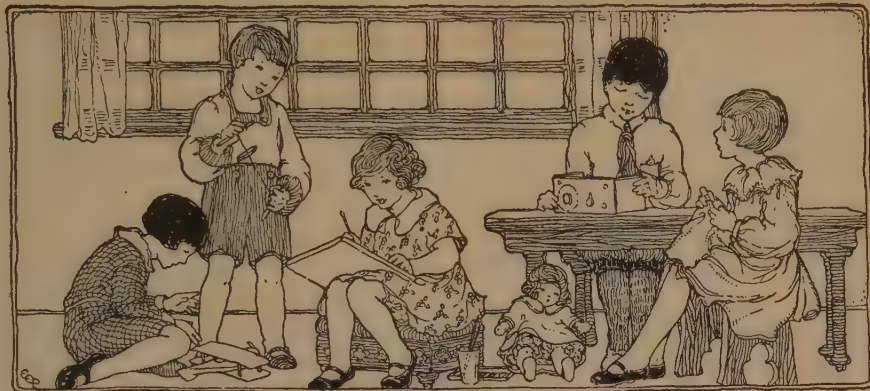


The fruit grows on the previous year's shoots and ripens after a year.



Much paper used to-day is made from wood, ground into pulp, and forests of spruce are grown for this purpose. It is a tall, graceful tree, and is one of the oldest of forest trees, for remains of it have been found among the fossils. There are several species of spruce, and some of them grow to a great height.

The photographs on these pages are by Henry Irving.



HOW TO MAKE A SEWED BOOK

HERE is a book which you may make so well by hand that it will closely resemble the commercial, or machine-made, ones. First cut and fold the leaves. For these use anti-rust paper 24 inches by 36 inches, because it is tough and best adapted for your first sewed book. You should avoid paper which will tear easily. Next cut one sheet once for each dimension so you will have four pieces of equal size. Then fold each sheet in the following manner: First, lay the

CONTINUED FROM 4088

they are to be placed in the book. The signature is the number or letter placed near the

bottom of the page, either in the corner or the centre of a section, to indicate its order in the book. Americans usually refer to both section and signature as signature. The sheet is correctly called by the number of pages (on one side) into which it is divided—folio, quarto, octavo or duodecimo.

The parts of the book are as follows: the head, which is the folded connection of each

1	91	51	4
8	2	12	5

2	41	51	2
6	11	10	7

1. The paging of the folded sections.

sheets in a stack on the table with one longer dimension along the table edge next to you. Second, fold the back edge over to the edge of the table and crease. Third, fold over from right to left, bringing upper edge to $\frac{1}{16}$ inch of the lower edge. Fourth, fold over from right to left, bringing the edges even. Fifth, number the sheets in the first section. Sixth, open the sheet and note the arrangement of numbers, which should be as shown in picture 1. This particular paging is known as an octavo-fold section. The simpler forms of bookmaking have already been explained in the earlier volumes.

The folded sheet is called a section. These sections are numbered in the order in which

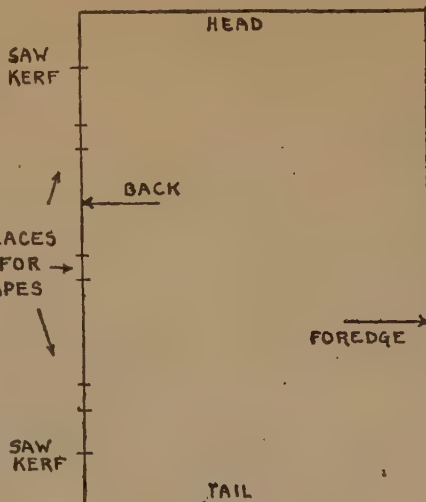
two sheets; the foredge, which is part raw edges and part folded edges; the tail, which is all raw edges; and the back, which is all folded edges. See picture 2.

The next step is to assemble, or collate, the book. See that all sections and pages are in their correct order and that all page and signature marks are correctly placed in number sequence.

To knock up the book, take the book between the ends of the fingers of both hands with the back of the book down, head away from you, tail toward you, and fore-edge up. Knock the back on the table until the edges of these sections are even. Now turn the head down and knock up. Then

turn the book on the fingers of the left hand so that the head is to the right, the back toward you, the tail to the left, and the foredge away from you. Now slip your right hand under the head and carefully drop on the table parallel to its edge. You should place a weight of sufficient size on it.

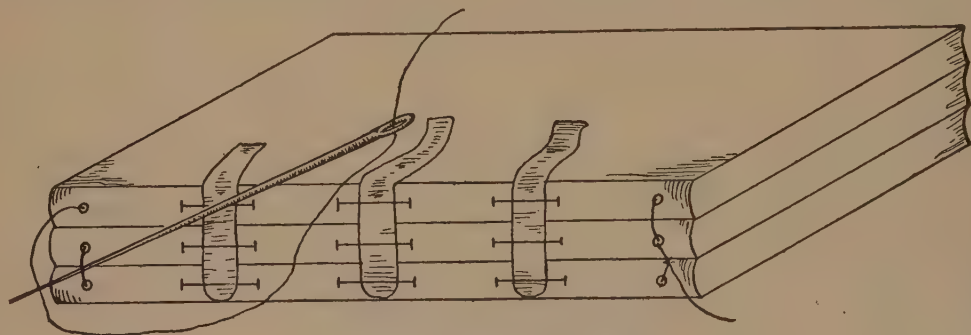
Next mark up the book for sewing. The length of the book is the distance from the head to the tail, while the width is the distance from the back to the foredge. To mark up for the tapes, first take a piece of paper just the length of the book. For the three tapes divide this paper into four equal parts. Then mark the back of the top section with these divisions. Each part is called a panel. Beginning at the tail, mark above each panel a dis-



2. Parts of the book.

is toward you and the head is to the right. Then turn all sections over, away from you, so that the head is to the right, the back is away from you, and page 1 is up. Next turn the first section back toward you, along the edge of the table with the head to the right. Now open to the middle, bending the under sheet slightly so that the fold is easily accessible. Without lifting the work from the table, prick holes at the pencil-marks and thread the needle without using a knot. Enter the book from the back at the head of the kettle-stitch, holding the needle in your right hand. Put your left hand inside and pull the needle through. You

should keep your left hand inside, and your right hand outside throughout all of this sewing. Now sew through and out at tail kettle-



3. How the kettle-stitch is made.

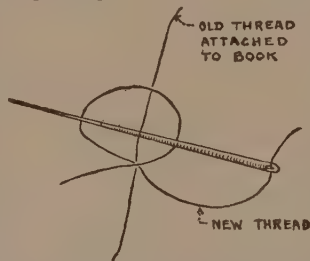
tance equal to the width of the tape to be used. Be careful not to squeeze the tapes while marking. Now fold a piece of paper at right angles. Knock up the book again and lay this paper on one mark so that the fold lies along back of the top section. Next, carry the marking down on the other sections along the edge of this paper. Then do the same for each mark for the tapes.

To mark up for the kettle-stitch, or catch-stitch, first mark $\frac{1}{2}$ inch from the head and the tail on the top section. Then carry the mark down to the other sections and knock up the book. Now lay it on the edge of the table next to you so that the back extends over the edge $\frac{1}{4}$ inch. With a downward stroke, saw the kettle-stitch groove. If no saw is available, you may snip each section with a pair of scissors.

The sewing may be done either with or without frames. As you will sew without frames, first lay the book on the table so that the back

stitch and insert the tapes in their places along the back before tightening the thread. Next turn the surplus of the lower tapes under the book very neatly and carefully.

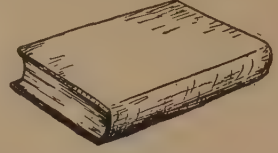
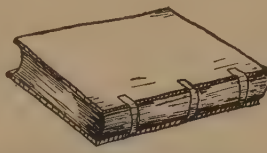
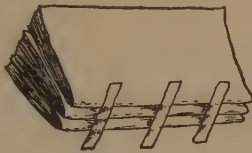
Then turn over the second section on the first, head to right, tail to left, back along the edge of the table and open and prick. Enter the kettle-stitch at the tail and come back to the head. To tighten the thread, pull in the direction in which the thread has been traveling. Then tie the thread in a square knot with the end which was left at the beginning of the sewing. Now put on a third section. Enter the kettle-stitch at the head, come out at the tail, and tighten the thread. Be certain to make a kettle-stitch, as otherwise there would be an opening between the section being sewed on and the one below it. This is certain to close it. Draw the thread up into the groove. Now put on the fourth, and last, section. Enter the tail kettle-stitch, sew, and tighten. For the last



4. Knot about to be drawn up.

kettle-stitch, kettle twice, once in the opening below the regular kettle-stitch. The threads should be cut $\frac{1}{2}$ inch long. Picture 3 shows how the kettle-stitch is made.

To tie on a new thread, always tie between tapes so that the knot can be drawn to the inside of the book, through the needle pricks. The method of tying is as follows: First, thread up the new thread, holding the needle in the last three fingers of the right hand. Then hold the end of the new thread in the left hand. With the thumb and the first finger of the right hand throw the loop (behind) with the thread in the left hand. Next, place the loop on the old thread 1 inch from the book, or a distance equal to that of halfway between the tapes. Take up with the needle the old thread through the loop of the new thread. Then pull up, making sure that the old thread snaps up into the loop. Now pull the knot to the inside of the book. Picture 4 shows the knot which is ready to draw up.



5. Three final stages in binding the book.

To glue the book, first tighten tapes. Now knock up the head and the back before placing the glue all along the back and between the sections. Carefully fill all of the holes and the cracks. Then dry under a moderate weight.

To make the case-cover, first take a sheet of ordinary writing-paper. Then $\frac{3}{4}$ of an inch down from the top draw a straight line along the top, which is the allowance for turnover. From the top edge draw another line down through the middle of the sheet at right angles with the top. Then draw a second line to the left parallel to this line, allowing the width of the back of the book between the two lines. Now draw a line $\frac{1}{4}$ inch from these two, placing it on each side and parallel to these. These two $\frac{1}{4}$ -inch spaces are to provide hinge space. From the intersection of the head turnover line with the back, measure along the back length of the boards. This will include the length of

the covers; lap $\frac{1}{4}$ inch on the cloth, having the scored groove where the lap comes.

To put the book in the case, first fold the end-sheets so that each one is just the size of the book. Next paste one end-sheet on the first sheet and the other on the last sheet of the book, placing these $\frac{1}{4}$ inch along the back edge. After cutting the tapes 1 inch in length and pasting these on the end-sheets, paste the super on the back and over on the end-sheets. Then place the book in the case, pushing it well back. Protecting the remaining sheets, put paste on the end-sheet. Carefully put the cover down, turn it over, and smooth carefully. Do the same with the other cover. Now press the book, placing it square and having one cover exactly over the other. This should be pressed under a light weight for about two days. Picture 5 shows these three final stages in binding the book.

OILSTONES AND HOW TO CARE FOR THEM

WASHITA oilstone rock is crystallized silica.

The crystals are very small, and are formed in clusters with pointed ends interlaced, leaving numerous cavities. These minute crystals are hexagonal in shape, with sharp points, and can be seen under a microscope when magnified about a hundred times. They are harder than steel, and that is why whetstones cut from this rock will wear away and sharpen steel tools. Washita whetstones are called "oilstones" because oil must be used to fill the cavities and float away the steel particles that are cut off the tools.

The peculiar geological formation from which these rocks are taken is not known to exist outside of the state of Arkansas, where it occurs in many of the mountains of Saline, Hot Springs, Garland and Montgomery counties. These strata are in a vertical position, varying

from nearly perpendicular to nearly horizontal, and have been considerably broken up by the upheaval or folding of the earth's crust.

The best Washita oilstones weigh about $1\frac{1}{4}$ or $1\frac{1}{6}$ ounces per cubic inch, and a stone of standard size, $1\frac{1}{2}$ " x 2" x 8", should weigh 1 pound $6\frac{1}{2}$ ounces, or 1 pound $7\frac{1}{2}$ ounces.

By continual use the stone will show the wear more at the ends than at the middle. This is due to the fact that tools are usually reversed while being sharpened. When the stone is uneven, a good job of sharpening cannot be done, so it is then necessary to level the stone.

There are many ways to do this. One of the best and quickest methods is to take a sheet of No. 1 or No. $1\frac{1}{2}$ sandpaper and place it on a level board. Then rub the stone back and forth until it is level. Two or three sheets of sandpaper are sufficient for this process.

HOW TO STUDY THE HABITS OF ANTS

THE habits of ants are so interesting that men of science have spent a great part of their lives studying them and their habits. We read something about these wonderful little creatures in that part of this book that begins on page 6349, but we may ourselves keep ants as pets, and very interesting they are. The glass case in which ants are kept in the house is called a formicarium, a word that is made up from *formica*, the Latin, or scientific, name for the ant. Formicariums may be bought all ready and complete at some shops, but it is much more interesting to make our own, and as it is easy to do this, let us see what is needed.

We must get two sheets of glass about 12 inches square, two strips of glass 12 inches long and $\frac{1}{2}$ inch wide, and two strips 10 inches long and $\frac{1}{2}$ inch wide. These may be bought at any glazier's, cut to the sizes named, and ordinary window-glass will do very well. Now we must take one of the squares, and fasten the two 10-inch strips and one of the 12-inch strips around the sides, flush with the edges, as shown in picture 1. Either glue or paste may be used for this purpose. When the strips are dry we must stick the other sheet of glass on the top of them, so that we shall have a shallow box without a lid, and with the narrow sides not reaching quite to the top of the wider sides of the case. Naturally this box is quite transparent.

The formicarium is all ready to receive the earth from which the ants are to form their nest or camp. The very best mold for this purpose is, of course, that to be obtained from an ant-hill, and this we can get in almost any garden or field in town or country. The earth may be put into the glass case by pouring it in at the top through a paper funnel, made in the same way that a grocers' sugar-bag is made. Sufficient earth is needed to half fill, or a little more than half fill, the formicarium, and a vacant space should be left in the centre with passages to the openings above the 10-inch strips. The top, which consists of the remaining 12-inch strip of glass, is then put on the top, and glued or pasted in place. We now have our formicarium all ready for the ants, with two doorways, or openings, one on each side, and the appearance of the case is as shown in picture 2.

We have next to catch our ants. Any kind will do, and we shall probably find what we want in the garden. We must dig down deep into the encampment to find the queen, who can easily be distinguished by her large size. The pictures on page 6351 of this book

will perhaps help us. A bottle is a very good thing in which to carry the ants from the garden to the room where we are making our formicarium. Having put the queen in the bottle, we can place with her about fifty worker ants.

The next task is to get these into the glass case. We must close up one of the little doors with rag or wadding. Then, if we take a tea-tray and fill it with water, and stand a dish in the tray and then lay the formicarium on the dish, the ants' new home will be cut off

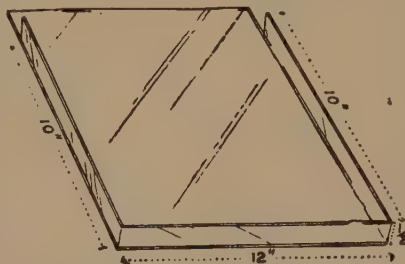
by water from everywhere. We cover the glass case with a newspaper folded up, and lay our bottle on the paper with the cork out. The ants soon swarm out and all over the paper, but we guide the queen ant toward the opening of the formicarium and get her in; the worker ants will all follow very soon. As soon as they are in we plug up the doorway with a piece of wadding, and our formicarium is complete.

We may, of course, ornament it in any way we like, but this is a matter of taste. The ants will soon get to work, and for hours we may watch them making their homes and performing their various duties without any fear of our getting tired, for there is no more absorbing recreation than watching an ant city being built.

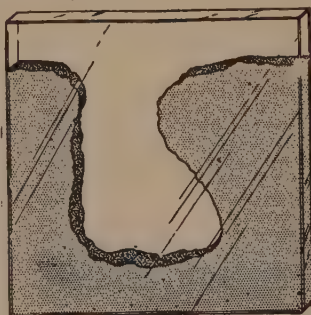
The formicarium should be kept in a shady place, and when not being watched a cloth may be thrown over it. It must never stand in the sun, and it is better to examine the ants by artificial light, as the little creatures do not mind this at all, whereas they do not like daylight and will soon get out of sight if exposed to it. The earth should be kept moist by squirting a very little water into the case from time to time with a small syringe or a fountain-pen filler. The only food needed by the ants is a little honey placed inside the opening every day or two. A few of the little white creatures that ants make pets of should

be put in the nest, as they act as scavengers and keep the ant city clean. These can be found in ant-hills everywhere.

Thus completed, the formicarium is one of the most wonderful things that can be seen. The ants will make tunnels and corridors and lanes and rooms, and nurseries for their young ones, with front doors and side doors; and all the different kinds of ants will do their different kinds of work right before our eyes. As they have not the chance to get at another nest of ants, they will do no fighting, which is the least attractive of all the habits in which the ants are so like men.



1. How the glass case is built up.



2. The formicarium ready for the ants.

MAKING A SIMPLE TELESCOPE

IT is possible to make a telescope out of cardboard that will show the mountains and dead volcanoes in the moon, of which we have all read. With this telescope we shall be able to see the moon so clearly that it will seem quite close, and we shall find it a fascinating world to watch. When it is "new" we can see the great mountains just catching the sunlight on their tops, and then, night after night, we may see the sunlight creeping toward more and more mountains, and flooding them with white light until the whole beautiful surface is bright and glowing.

A simple telescope is merely a long tube with a glass lens at each end.

It does not matter what the tube is made of. We are going to make ours out of sheets of brown paper, which will be stuck together until we have formed stiff cardboard. First we must find a piece of curtain-pole about 2 inches thick and about 3 feet long. We are going to wrap our brown paper round this so as to make a tube.

When we have got this curtain-pole, and three or four large sheets of good brown paper that can be bought at any stationer's, we are ready to begin. We lay the paper out on a table and make it slightly damp with a sponge. It must not be made really wet, but only just damp enough for all the creases to come out. Now we make some glue with plenty of water. It should not be any thicker than the ordinary mucilage.

When this is ready we take one sheet of the brown paper and wrap it once round the curtain-pole. Then, holding it so that it cannot slip, we spread some glue on the paper with a big brush and roll it round the pole bit by bit, until all the paper covered with glue has been rolled up. One or two more sheets should be stuck over the first in the same way; and then the pole, with the thick coat of paper round it, must be put away to dry.

Next morning we shall find that we can pull the curtain-pole out of the paper, and then we shall have a long tube of strong and thick cardboard that will look very neat and smooth, because the paper has shrunk a little in drying, and so there are no creases. The glue will have made it almost as hard as wood.

Now we must go to an optician's shop and buy the lenses. Of course telescope lenses are made in all sizes, and we must explain exactly what we want. We shall need two, one big one, and one little one for the eyepiece.

These magnify enough for us to see some

of the larger features of the moon; but if we want to see more, we must pay more money for the lenses. Very strong ones that would show all the mountains and valleys splendidly can be bought, if desired.

The optician will tell us the focus of the lens we buy. If he says it is 30 inches, he means that the cardboard tube we have made must be cut to 30 inches in length. If the lens is 24-inch focus, our tube must be only 24 inches long.

When we have bought the lenses we must fit them into the tube with cardboard. First we take the big one. Perhaps we shall find

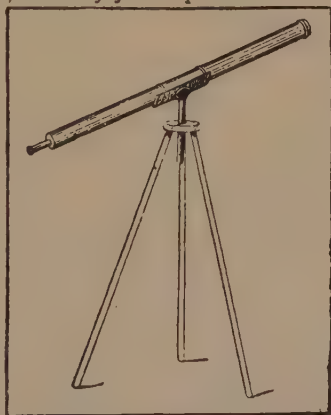


1. The cardboard telescope.

A. Cardboard tube. B. Piece of curtain-pole. C. Small cardboard tube for eyepiece. D. Eyepiece. E. Object lens. F. Cardboard support for lens.

that it exactly fits into our 2-inch tube; but if it should be a little too small, we must line one end of the tube with more brown paper until it fits. Now we cut two strips of thick cardboard about 1 inch wide, and just long enough to go once around the inside of the tube. One of these little hoops of cardboard must be glued into the tube about 3 inches from the end. When that has stuck nicely, the lens is put in so that it rests against the edges of the cardboard hoop.

The other strip of cardboard must now be wound round inside the tube and pressed against the lens. This will hold the glass in position. It should not be glued in, as sometimes it is necessary to take



2. The cardboard telescope complete on tripod-stand made of three broomsticks.

the lens out to clean it. Now we must make a smaller tube for the eyepiece at the other end. This small tube is made exactly like the big one; but this time we shall wrap our brown paper round a stick that is just as thick as the diameter of the eyepiece. When the tube is made, the eyepiece is fixed in, like the big lens, with cardboard, but closer to the end of the tube. Then we cut a round piece of wood the size of a half-dollar, and drill a very small hole in the centre. This is to be glued at the end of the tube, as shown in picture 1. Now we have only to fix the small tube and the big tube together. We saw off a piece

of the curtain-pole, about 1½ inches long. Then, with a brace and a centre-bit, or an augur-bit, we must bore a hole large enough for the small tube to slide through. Then the piece of curtain-pole is glued in the big tube, the little tube is put in the hole, and our telescope is ready.

When night comes we can point it at the moon. If we draw the small tube backward or forward very gently, suddenly we shall see the mountains of the moon.

A tripod-stand exactly like the one shown in picture 2, can be made out of three broomsticks very easily.

GIVING FIRST AID TO THE INJURED

WHAT TO DO UNTIL THE DOCTOR COMES

SOME time ago in a busy New York street a man met with a serious accident and was in danger of bleeding to death. But a boy stepped from the crowd that had gathered, and making a bandage and pad from a stone and a handkerchief, he tied these on the wounded man in such a way that the bleeding was stopped, and a doctor was able to reach the man in time to save his life.

Now, this was a splendid thing for a boy to do, and it is a thing that every boy and girl who reads this book may do also if necessity arises. The boy who saved the man's life in a New York street had been through a course of study for rendering first aid to the injured; and in these lessons we are going to learn what to do in case of accidents of all kinds—fractures, or broken bones, hemorrhage, or bleeding, sprains, burns, scalds, bruises, drowning, poisoning, and other calamities that come suddenly.

We must distinctly understand that first aid is not intended to take the place of the doctor's work, and in all cases of serious accident we should call a doctor to the patient as soon as possible. But while someone has gone for the medical man it is important that the very best should be done for the patient. If he has broken his leg, the broken bone must not be allowed to do any further injury; if he has cut himself, the bleeding must be stopped at once; and in all cases the patient must be placed in such a position that he will suffer as little pain as possible. And it is to help every boy and girl to know how to do these things that these lessons in First Aid to the Injured are being given.

We must look upon them not as lessons, but as something that will always be useful to us. We shall find a great deal that is very interesting, and when we come to bandaging we can learn to become quite skillful at it by tying up one another for practice. If we are going to be successful and useful in this most valuable study—and surely we all want to be

first-rate at everything—there are a number of points that we must remember at the outset.

For instance, we must be ever on the alert, so as to be ready to render help as soon as an accident occurs; we must be full of resource, so that we can make use of whatever may be at hand, even though proper bandages and splints and stretchers are not available—just as the boy used his handkerchief and a stone for a bandage and pad. Then we must be observant so as to notice all the circumstances of an accident, and in case of several injuries we must decide without any hesitation which of them should have attention first.

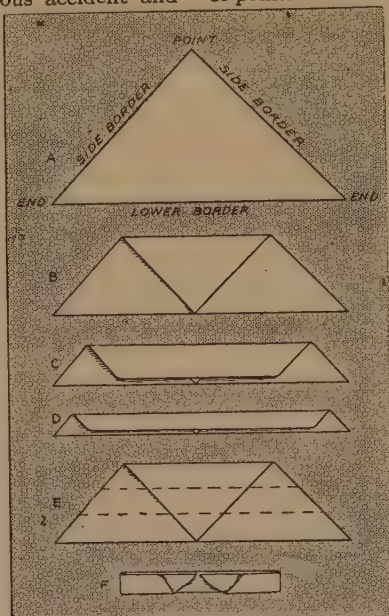
It is important that an injured person should have plenty of air, and if breathing seems to have stopped we must take steps to restore it. Then we must always see that any injured part is carefully supported, and the warmth of the patient should be maintained by placing a cloak or coat around him, especially if the weather is cold.

For broken arms and legs splints are needed—that is, something solid and firm to which the arm or leg may be bound so that the parts above and below the fracture may not move independently of one another and still further increase the injury.

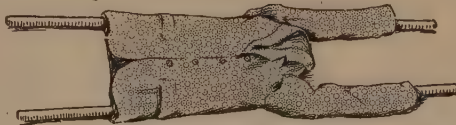
For this purpose all kinds of things are useful—walking-sticks, umbrellas, baseball-bats, broom-handles, pieces of wood, and so on; and, before being applied, these should be padded with a coat or some handkerchiefs or sacking—anything soft, in fact, in order to prevent any jolting. We shall learn later on how to apply a splint.

We now come to bandages. Bandaging is of the greatest importance in all cases of injury, and when no proper bandages are available we can make them out of handkerchiefs, neckties, belts, and so on. Proper bandages, however, are very often close at hand, as in the case of

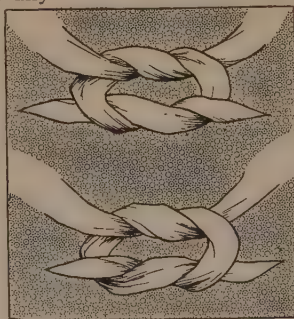
accidents on the football field, for many players carry a bandage with them, and we must learn how to fold and tie these.



1. How to fold a triangular bandage.



2. A stretcher made from a coat and two poles.



3. Granny knot and reef knot.

The most useful kind of bandage is the triangular bandage shown in picture 1. Two such bandages are made out of a square yard



4. A three-handed seat.

of calico by cutting diagonally across—that is, from corner to corner. This gives us two triangles of the shape shown in the picture, and each side and angle of the bandage have a special name. From this triangle we can fold a broad or a narrow bandage. We first fold the point to the lower border, as in *B*, and then for a broad bandage we fold over once again, as at *C*, and for a narrow bandage still once again, as at *D*. For a medium bandage we make two folds, as at *E*, after folding the point to the lower border. When not in use we fold as a narrow bandage and turn the ends in as in *F*. We shall learn later how this bandage is used for different injuries, but it is necessary for us to know how to tie the bandage when it is on. The granny knot is quite useless because it so easily comes undone. We must always tie a reef knot, shown in picture 3, so that the bandage may not come undone; a little practice will make this quite easy.

In addition to triangular bandages there are roller bandages, which are strips of linen, calico, muslin, of different widths and lengths; but for first-aid work the triangular bandage is much simpler to use, and, besides, the strips of material would be rarely available in an emergency.

When anyone meets with an accident it is often necessary to remove some of his clothes, such as a coat or shoe and stocking. This has to be done very carefully, and there is a regular method to be followed. In removing a coat we take it off the uninjured side first, and then, if necessary, cut the stitches of the seam in the sleeve and lift the coat away. A shoe should be unbuttoned or unlaced, and the back seam cut open carefully. Stockings or socks can be cut off an injured foot with scissors or a penknife. In burns and scalds, the clothing must never be dragged from the injury, but any part adhering should be cut round and left for a doctor to attend to.

In lifting and carrying an injured person the greatest care must be exercised, and in serious cases, such as those of injuries to the back, it is better to wait for a doctor's arrival. In other cases, where bones have been broken, the utmost care is needed to prevent the

ends of the fractured bone from causing still further injury.

For stretchers we can use hurdles, shutters or planks, but if we use shutters or planks we must be sure to carry them slung in ropes or straps, in order to save jarring the injured person, and we should place coats upon them to make them soft and comfortable. When nothing of this kind is available, we can make a stretcher by buttoning up a coat and slipping poles through the sleeves and along the sides of the coat as shown in picture 2. If a larger stretcher is wanted, two coats may be arranged in this way on the same two poles. Sacks may also be stretched on poles by passing the poles through holes in the bottom corners. Of course every stretcher should be tested before using.

In lifting a patient on a stretcher there must be gentle, steady effort without any jarring, and if an arm or leg is injured, some helpers must support the wounded limb. The head should also be supported. The stretcher should be carried quite horizontally, and the bearers should, as far as possible, be of the same height. They should march with a short step and bend the knees as they march. Where no stretcher is available we must make a seat for the patient with our arms. For what is known as a two-handed seat two bearers face each other and stoop down, one on each side of the patient. They each place one arm under his back just below his shoulders, and the other arms are passed under his legs, the hands being clasped. The way to make a



5. A four-handed seat.

three-handed seat, with a rest for the patient's back, and also a four-handed seat, with which another helper must support the patient's back and head, is shown in pictures 4 and 5. If there is only one helper for an injured man, and the injury is not very great, he may be assisted as shown in picture 6.

We must remember to be gentle always, avoiding any jerky movement. This is difficult when one person must give all the assistance.

If we remember these instructions accurately, we may be of assistance in some emergency.

A time may come when such knowledge will prove valuable and prevent much suffering.

The next lessons in first aid are on page 4618.



6. Helping an injured man.

WHAT IS WRONG WITH THIS STEAMER?



When you stand on a busy wharf at a large seaside town you often gaze at the large ships that bring the wheat and the timber and all the wealth of the world for use in all parts of the country. Here is a picture of one of these great steamers, and in making his drawing the artist has made at least ten mistakes. Can you tell where he is wrong? Compare your list with that given on page 4374 of this book.

The Book of POETRY

A FABLE TOLD IN VERSE

AMONG the many lesser poets who, while attempting only the treatment of homely subjects, have yet left us poems which, though in form no better than the commonest rhyme, have said something that will be long remembered, Mary Howitt has a place of some eminence. We have already had occasion to speak of Mrs. Howitt and her husband, William Howitt, in reading other poems of theirs printed in this book. They deserve to be remembered for the healthy and elevating character of all they wrote. None of Mary Howitt's verses for young people is better known than *The Spider and the Fly*. Like many another of the poems given in our book, this is a fable in rhyme. The story itself is a very old one, the idea of the spider luring the silly fly to destruction having been a popular illustration of the danger of listening to flattery long before Mrs. Howitt gave it this versified form.

THE SPIDER AND THE FLY

"WILL you walk
into my parlour?" said the
Spider to the
Fly.

"'Tis the prettiest little parlour
that ever you did spy;
The way into my parlour is up a
winding stair,
And I've many curious things to
show when you are there."

"Oh, no, no," said the little Fly, "to ask me
is in vain;
For who goes up your winding stair can
ne'er come down again!"

"I'm sure you must be weary, dear, with
soaring up so high;
Will you rest upon my little bed?" said the
Spider to the Fly.

"There are pretty curtains drawn around;
the sheets are fine and thin;
And if you like to rest a while, I'll snugly
tuck you in!"

"Oh, no, no," said the little Fly, "for I've
often heard it said,
They never, never wake again, who sleep
upon your bed!"

Said the cunning Spider to the Fly: "Dear
friend, what can I do
To prove the warm affection I've always
felt for you?"

I have, within my pantry, good store of all
that's nice;
I'm sure you're very welcome—will you
please to take a slice?"

"Oh, no, no," said the little Fly, "kind sir,
that cannot be;
I've heard what's in your pantry, and I do
not wish to see!"

"Sweet creature!" said the Spider, "you're
witty and you're wise,
How handsome are your gauzy wings,
how brilliant are your eyes!

I've a little looking-glass upon my parlour
shelf,

If you'll step in one moment, dear, you
shall behold yourself."

CONTINUED FROM 4120



"I thank you, gentle
sir," she said,
"for what you're
pleased to say,

And bidding you
good-morning now, I'll call
another day."

The Spider turned him round
about, and went into his den,

For well he knew the silly Fly would soon
be back again;

So he wove a subtle web, in a little corner
sly,

And set his table ready to dine upon the
Fly.

Then he came out to his door again, and
merrily did sing:

"Come hither, hither, pretty Fly, with the
pearl and silver wing;

Your robes are green and purple—there's
a crest upon your head;

Your eyes are like the diamond bright, but
mine are dull as lead!"

Alas, alas! how very soon this silly little
Fly,

Hearing his wily, flattering words, came
slowly flitting by;

With buzzing wings she hung aloft, then
near and nearer drew,

Thinking only of her brilliant eyes, and
green and purple hue—

Thinking only of her crested head—poor,
foolish thing! At last

Up jumped the cunning Spider, and fiercely
held her fast.

He dragged her up his winding stair, into
his dismal den,

Within his little parlour—but she ne'er
came out again!

And now, dear little children, who may
this story read,

To idle, silly, flattering words, I pray you
ne'er give heed;

Unto an evil counsellor, close heart and
ear and eye,

And take a lesson from this tale of the
Spider and the Fly.

THE CASTLE-BUILDER

Famous among the writers of France is Jean de La Fontaine, born 1621, died 1695. Although an idle and good-for-nothing sort of fellow, he was a writer of great and original gifts. He is best remembered for his fables in verse, which have often been translated into English, and a typical example of which is here given. Every boy and girl is, no doubt, familiar with the "moral" of this fable, "Never count your chicks before they're hatched."

IT happened on a summer's day,
A country lass as fresh as May,
Decked in a wholesome russet gown,
Was going to the market town;
So blithe her looks, so simply clean,
You'd take her for a May-day queen;
Though for her garland, says the tale,
Her head sustained a loaded pail.
As on her way she passed along,
She hummed the fragments of a song;
She did not hum for want of thought—
Quite pleased with what to sale she brought,
She reckoned by her own account,
When all was sold, the whole amount.
Thus she—"In time this little ware
May turn to great account with care:
My milk being sold for—so and so,
I'll buy some eggs as markets go,
And set them; at the time I fix,
These eggs will bring as many chicks;
I'll spare no pains to feed them well;
They'll bring vast profit when they sell.
With this, I'll buy a little pig,
And when 'tis grown up fat and big,
I'll sell it, whether boar or sow,
And with the money buy a cow:
This cow will surely have a calf,
And there the profit's half in half;
Besides, there's butter, milk, and cheese,
To keep the market when I please:
All which I'll sell, and buy a farm,
Then of sweethearts have a swarm.
Oh, then for ribands, gloves, and rings!
Ay, more than twenty pretty things—
One brings me this, another that,
And I shall have—I know not what!"
Fired with the thought, the sanguine lass,
Of what was thus to come to pass
Her heart beat strong; she gave a bound
And down came milkpail on the ground:
Eggs, fowl, pig, hog (ah, well-a-day!)
Cow, calf, and farm—all swam away!

BEAUTIFUL THINGS

This little poem by Ellen P. Allerton tells us that true beauty lies in something more than outward loveliness.

BEAUTIFUL faces are those that wear—
It matters little if dark or fair—
Whole-souled honesty printed there.

Beautiful eyes are those that show,
Like crystal panes, where hearth-fires glow,
Beautiful thoughts that burn below.

Beautiful lips are those whose words
Leap from the heart like songs of birds,
Yet whose utterance prudence girds.

Beautiful hands are those that do
Work that is earnest, and brave, and true,
Moment by moment, the long day through.

Beautiful feet are those that go
On kindly ministries to and fro,
Down lowliest ways, if God wills it so.

Beautiful shoulders are those that bear
Ceaseless burdens of homely care,
With patient grace and daily prayer.

Beautiful lives are those that bless—
Silent rivers of happiness,
Whose hidden fountains but few may guess.

Beautiful twilight at set of sun;
Beautiful goal, with race well won;
Beautiful rest, with work well done.
Beautiful graves, where grasses creep,
Where brown leaves fall, where drifts lie deep
Over worn-out hands—oh, beautiful sleep!

WHAT BOBBIE WOULD LIKE

By permission of Frederic E. Weatherly we are able to print here these pretty verses from his pen. Although he has written so much for the grown-ups, yet he takes his pen to write children's thoughts every now and then.

I'D like to be a farmer,
With lots of stacks and mows,
And fowls and pigs, and carts and gigs,
And four-and-twenty cows.
I'd drive them all to market,
On summer mornings fine;
"Oh, come and buy," I'd stand and cry,
"Buy, buy, good masters mine!"
But if they would not buy them,
It would not give me pain;
I'd simply say: "Fair sirs, good-day!"
And drive them home again.

I wish I were a farmer,
With lots of lambs and sheep,
I'd run and play with them all day,
Until we went to sleep.
I'd take the wool to market
On summer mornings fine—
"Oh, come and buy," I'd stand and cry,
"Buy, buy, good masters mine!"
But if they would not buy my wool,
It would not cause me pain,
I'd come and say: "Dear sheep, good-day.
Here is your wool again."

And if they could not put it on,
I'd put it on myself;
And all the rest, when I was drest,
I'd lay upon the shelf.
For when the winter days come round,
And all the world is cold,
I know full well my wool will sell
For all its weight in gold.
And so I'll be a farmer,
Right happy in my lot,
And he who cares may buy my wares,
And other folk need not!

THE CAGED BIRD

These lines are by William Lisle Bowles, a clergyman and poet of great distinction in his day, whose poems were admired by such great writers as Coleridge and Wordsworth. His works are now little read, and are familiar only to students. He was born in 1762 and died in 1850.

OH, who would keep a little bird confined
When crowslip bells are nodding in the
wind,
When every hedge as with "good-morrow"
rings,
And, heard from wood to wood, the blackbird
sings?

Oh, who would keep a little bird confined
In his cold wiry prison?—Let him fly,
And hear him sing: "How sweet is liberty!"

HOME THOUGHTS IN LAVENTIE

The writer of this delightful sketch from the midst of grim war, Edward Wyndham Tennant of the Grenadier Guards, was one of the rarest spirits released from the earth during the appalling struggle of the World War. As a child he showed qualities that promised genius. As a young soldier he was beloved by his regiment. He gathered the spirit of joy from all life's simpler beauties. He was killed on the Somme by a sniper's bullet.

GREEN gardens in Laventie!

Soldiers only know the 'street
Where the mud is churned and splashed
about

By battle-wending feet;
And yet beside one stricken house there is a
glimpse of grass,
Look for it when you pass.

Beyond the Church, whose pitted spire
Seems balanced on a strand
Of swaying stone and tottering brick,
Two roofless ruins stand,
And here behind the wreckage where the
back wall should have been
We found a garden green.

The grass was never trodden on,
The little path of gravel
Was overgrown with celandine;
No other folk did travel
Along its weedy surface but the nimble-
footed mouse
Running from house to house.

So all among the vivid blades
Of soft and tender grass
We lay, nor heard the limber wheels
That pass and ever pass,
In noisy continuity until their stony rattle
Seems in itself a battle.

At length we rose up from this ease
Of tranquil happy mind,
And searched the garden's little length
A fresh pleasure to find;
And there some yellow daffodils and jasmine
hanging high
Did rest the tired eye.

The fairest and most fragrant
Of the many sweets we found
Was a little bush of Daphne flower
Upon a grassy mound,
And so thick were the blossoms set and so
divine the scent
That we were well content.

Hungry for Spring, I bent my head,
The perfume fanned my face,
And all my soul was dancing
In that lovely little place,
Dancing with a measured step from wrecked
and shattered towns
Away . . . upon the Downs.

I saw green banks of daffodil,
Slim poplars in the breeze,
Great tan-brown hares in gusty March
A-couching on the leas;
And meadows with their glittering streams,
and silver scurrying dace,
Home—what a perfect place!

MY OLD FRIEND

It is curious that poetry has not provided many close and intimate studies of friendship. The romances of friendship have been told, but not much has been said about the ordinary effects of a friendly presence. This charming study is by that delightful Cambridge don Dr. Arthur Christopher Benson, who is graceful in prose, verse and friendship.

IT seems the world was always bright
With some divine unclouded weather
When we, with hearts and footsteps light,
By lawn and river walked together:

There was no talk of me and you,
Of theories with facts to bound them,
We were content to be and do,
And take our fortunes as we found them.

We spoke no wistful words of love,
No hint of sympathy and dearness,
Only around, beneath, above,
There ran a swift and subtle nearness.

Each inmost thought was known to each
By some impetuous divination:
We found no need of flattering speech,
Content with silent admiration.

I think I never touched your hand,
I took no heed of face or feature,
Only, I thought on sea or land
Was never such a gracious creature.

It seems I was not hard to please,
Where'er you led I needs must follow;
For strength you were my Hercules,
For wit and lustre my Apollo.

The years flew onward: stroke by stroke
They clashed from the impartial steeple,
And we appear to other folk
A pair of ordinary people.

One word, old friend: though fortune flies,
If hope should fail, till death shall sever,
In one dim pair of faithful eyes
You seem as bright, as brave as ever.

TREES*

One of the young poets of promise whose life was cut short by the World War was Joyce Kilmer, who was becoming widely known in America by his love of nature and the freshness and simplicity of his style. He died when he was only thirty-one years old. Had he written nothing except this poem on a tree he would be long remembered.

I THINK that I shall never see
A poem lovely as a tree,
A tree whose hungry mouth is prest
Against the earth's sweet, flowing breast;
A tree that looks at God all day,
And lifts her leafy arms to pray;
A tree that may in summer wear
A nest of robins in her hair;
Upon whose bosom snow has lain;
Who intimately lives with rain.
Poems are made by fools like me,
But only God can make a tree.

* From *Trees and Other Poems* by Joyce Kilmer, copyright, 1914, George H. Doran, publishers.

THE THREE BEST THINGS*

In these three sonnets Dr. Henry van Dyke gives a complete chart for a whole life's guidance.

WORK

LET me but do my work from day to day,
In field or forest, at the desk or loom,
In roaring market-place or tranquil room;
Let me but find it in my heart to say,
When vagrant wishes beckon me astray,
"This is my work; my blessing, not my
doom;
Of all who live, I am the one by whom
This work can best be done in the right
way."

Then shall I see it not too great nor small
To suit my spirit and to prove my powers;
Then shall I cheerful greet the laboring
hours,
And cheerful turn, when the long shadows
fall
At eventide, to play and love and rest,
Because I know for me my work is best.

LOVE

Let me but love my love without disguise,
Nor wear a mask of fashion old or new,
Nor wait to speak till I can hear a clue,
Nor play a part to shine in other's eyes,
Nor bow my knees to what my heart denies;
But what I am, to that let me be true,
And let me worship where my love is due,
And so through love and worship let me
rise.

For love is but the heart's immortal thirst
To be completely known and all forgiven,
Even as sinful souls that enter heaven:
So take me, dear, and understand my worst,
And freely pardon it, because confessed,
And let me find, in loving thee, my best.

LIFE

Let me but live my life from year to year,
With forward face and unreluctant soul;
Not hurrying to, nor turning from, the
goal;
Not mourning for the things that disappear
In the dim past, nor holding back in fear
From what the future veils; but with a
whole
And happy heart, that pays its toll
To Youth and Age, and travels on with
cheer.

So let the way wind up the hill or down,
O'er rough or smooth, the journey will be
joy,
Still seeking what I sought when but a
boy,
New friendship, high adventure, and a crown,
My heart will keep the courage of the quest,
And hope the road's last turn will be the
best.

* From Poems of Henry van Dyke, copyright, 1911, 1920, by Charles Scribner's Sons. By permission of the publishers.

FOR THE FALLEN†

The World War, with its terrible slaughter of young men, many of them the finest spirits of their generation, deeply moved all sympathetic and thoughtful men and women, and many poets tried to express the national feeling. It was felt widely that this poem in a wonderful degree put into a musical measure the pride and sorrow and remembrance of England. The writer, Laurence Binyon, is, besides being a poet, the author of excellent books on art, and one of the Keepers of Oriental prints in the British Museum. The poem was written for The London Times.

WITH proud thanksgiving, a mother for
her children,
England mourns for her dead across the
sea.
Flesh of her flesh they were, spirit of her
spirit,
Fallen in the cause of the free.

Solemn the drums thrill: Death august and
royal
Sings sorrow up into immortal spheres.
There is music in the midst of desolation
And a glory that shines upon our tears.

They went with songs to the battle, they were
young,
Straight of limb, true of eye, steady and
aglow.
They were staunch to the end against odds
uncounted,
They fell with their faces to the foe.

They shall grow not old, as we that are left
grow old:
Age shall not weary them, nor the years
condemn.
At the going down of the sun and in the
morning
We will remember them.

They mingle not with their laughing com-
rades again;
They sit no more at familiar tables at
home;
They have no lot in our labour of the day-
time:
They sleep beyond England's foam.

But where our desires are and our hopes pro-
found,
Felt as a well-spring that is hidden from
sight,
To the innermost heart of their own land
they are known
As the stars are known to the Night.

As the stars that shall be bright when we are
dust,
Moving in marches upon the heavenly
plain,
As the stars that are starry in the time of
our darkness,
To the end, to the end, they remain.

† By special permission of The London Times and Elkin Mathews, Ltd., London, who publish the volume entitled The Four Years, in which this poem appears.

THE FERN AND THE MOSS

This little poem by Eliza Cook is really a lesson in plant life. Many instances could be given of what might be called the friendship of the plants, for it is not only the moss and the fern that are of use to each other, but the poet has chosen the best illustration for her purpose.

THERE was a fern on the mountain, and moss on the moor;
And the ferns were the rich, and the mosses the poor.
And the glad breeze blew gaily, from heaven it came,
And the fragrance it shed over each was the same;
And the warm sun shone brightly, and gilded the fern,
And smiled on the lowly-born moss in its turn;
And the cool dews of night on the mountain fern fell,
And they glistened upon the green mosses as well.
And the fern loved the mountain, the moss loved the moor,
For the ferns were the rich, and the mosses the poor.

But the keen blast blew bleakly, the sun waxed high,
And the ferns they were broken, and withered and dry;
And the moss on the moorland grew faded and pale,
And the fern and the moss shrank alike from the gale.
So the fern on the mountain, the moss on the moor,
Were withered and black where they flourished before.

Then the fern and the mosses they grew wiser in grief,
And each turned to the other for rest and relief;
And they planned that wherever the fern-roots should grow,
There surely the moss should be sparkling below.

And the keen blasts blew bleakly, the sun waxed fierce;
But no wind and no sun to their cool roots could pierce;
For the fern threw her shadow the green moss upon,
Where the dew ever sparkled undried by the sun;
When the graceful fern trembled before the keen blast,
The moss guarded her roots till the storm-wind had passed;
So no longer the wind parched the roots of the one,
And the other was safe from the rays of the sun.

And thus and for ever, where'er the ferns grow,
There surely the mosses lie sparkling below;
And thus they both flourish, where naught grew before,
And they both deck the woodland, and mountain, and moor.

THE SOLDIER*

The pathos of this beautiful poem is redoubled when we know that the writer, Rupert Brooke, a young officer, lies buried in "some corner of a foreign field." Early in the World War he fell fighting for the England he loved, and of which he claimed to be, in some degree, an embodiment. What better consolation for his loss could he leave behind than this exquisite sonnet forever echoing in the world what is best in England?

IF I should die, think only this of me:
That there's some corner of a foreign field
That is for ever England. There shall be
In that rich earth a richer dust concealed;
A dust whom England bore, shaped, made aware,
Gave, once, her flowers to love, her ways to roam,
A body of England's breathing English air,
Washed by the rivers, blest by suns of home.
And think, this heart, all evil shed away,
A pulse in the eternal mind, no less
Gives somewhere back the thoughts by England given;
Her sights and sounds; dreams happy as her day;
And laughter, learnt of friends; and gentleness,
In hearts at peace, under an English heaven.

ALL THINGS BRIGHT AND BEAUTIFUL

There is no lack of children's hymns, though there are not many that are at once suitable for singing in church and for reading at home. But among the few with this double quality, this hymn by the late Mrs. Alexander, whose *Once in Royal David's City* we may read on page 6108, takes high rank, by reason of its unstrained beauty and simplicity of thought and expression.

ALL things bright and beautiful,
All creatures great and small,
All things wise and wonderful,
The Lord God made them all.

Each little flower that opens,
Each little bird that sings,
He made their glowing colors,
He made their tiny wings.

The rich man in his castle,
The poor man at his gate,
God made them, high or lowly,
And ordered their estate.

The purple-headed mountain,
The river running by,
The sunset and the morning,
That brightens up the sky—

The cold wind in the winter,
The pleasant summer sun,
The ripe fruits in the garden—
He made them every one;

The tall trees in the greenwood,
The meadows where we play,
The rushes by the water,
We gather every day.

He gave us eyes to see them,
And lips that we might tell
How great is God Almighty,
Who has made all things well.

* From *The Collected Poems of Rupert Brooke*, copyright, 1915, by Dodd, Mead & Co., Inc., and by permission of McClelland & Stewart, Ltd., Toronto.

LITTLE VERSES FOR VERY LITTLE PEOPLE

The writing of nursery rhymes is by no means so easy as one might imagine. Perhaps that is why so few good rhymes, which are really worth calling nursery rhymes, are written nowadays. When people think things are easy to do, they are apt to neglect them, or to do them in a slipshod way. But Miss Lawrence Alma-Tadema, who is a daughter of Sir Lawrence Alma-Tadema, the celebrated painter, has wisely thought it worth while to write nursery rhymes well, and, as a result, we have had many charming little verses of this kind from her pen. A selection from these is given on this page and the next. Like all that she has written, they have real musical movement in them, and, indeed, many of her poems for little folk have been set to music with great success.

MARCH MEADOWS

A LARK

LARK-BIRD, lark-bird soaring high,

Are you never weary?

When you reach the empty sky,

Are the clouds not dreary?

Don't you sometimes long to be

A silent goldfish in the sea?

Goldfish, goldfish diving deep,

Are you never sad, say?

When you feel the cold waves creep,

Are you really glad, say?

Don't you sometimes long to sing

And be a lark-bird on the wing?

LAMBS

O little lambs! the month is cold,

The sky is very gray;

You shiver in the misty grass

And bleat all the winds that pass;

Wait! when I'm big—some day—

I'll build a roof to every fold.

But now that I am small, I'll pray

At mother's knee for you;

Perhaps the angels with their wings

Will come and warm you, little things;

I'm sure that, if God knew,

He'd let the lambs be born in May.

A TWILIGHT SONG

BABY moon, 'tis time for bed,

Owlet leaves his nest now;

Hide your little horned head

In the twilight west now;

When you're old and round and bright

You shall stay and shine all night.

Baby girl is going, too,

In her bed to creep now;

She is little, just like you,

Time it is to sleep now;

When she's old and tired and wise,

She'll be glad to close her eyes.

THE NESTING HOUR

ROBIN-FRIEND has gone to bed,

Little wing to hide his head—

Mother's bird must slumber, too,

Just as baby robins do—

When the stars begin to rise,

Birds and babies close their eyes.

PLAYGROUNDS

IN summer I am very glad

We children are so small,

For we can see a thousand things

That men can't see at all.

They don't know much about the moss

And all the stones they pass;

They never lie and play among

The forests in the grass.

They walk about a long way off;

And, when we're at the sea,

Let father stoop as best he can

He can't find things like me.

But, when the snow is on the ground

And all the puddles freeze,

I wish that I were very tall,

High up above the trees.

THE NEW PELISSE

BABY'S got a new pelisse,

Very soft and very neat—

Like a lammy in her fleece

She's all white from head to feet.

Thirty lambs each gave a curl,

Mother sewed them, stitch by stitch—

All to clothe a baby-girl:

Don't you think she's very rich?

THE LITTLE SISTER

BATH-TIME

BABY'S got no legs at all;

They're soft and pinky, crumpled things.

If he stood up he'd only fall;

But then, you see, he's used to wings.

BED-TIME

Baby, baby, bye,

Close your little eye!

When the dark begins to creep,

Tiny-wees must go to sleep.

Lammy, lammy, lie,

I am seven, I;

Little boys must sleep and wait,

If they want their bed-time late.

Fidgy, fidgy, fie,

There's no need to cry!

Soon you'll never dress in white,

But sit up working half the night.

IF NO ONE EVER MARRIES ME



IF no one ever marries me—
And I don't see why they should;
For nurse says I'm not pretty,
And I'm seldom very good—

If no one ever marries me,
I shan't mind very much;
I shall buy a squirrel in a cage,
And a little rabbit hutch.

I shall have a cottage near a wood,
And a pony of my own,
And a little lamb quite neat and clean
That I can take to town.

And when I'm getting really old,
At twenty-eight or nine,
I shall buy a little orphan girl
And bring her up as mine.

KING BABY ON HIS THRONE

KING BABY on his throne
Sits reigning O, sits reigning O!
King Baby on his throne
Sits reigning all alone.

His throne is mother's knee,
So tender O, so tender O!
His throne is mother's knee,
Where none may sit but he.

His crown it is of gold,
So curly O, so curly O!
His crown it is of gold,
In shining tendrils rolled.

His kingdom is my heart,
So loyal O, so loyal O!
His kingdom is my heart,
His own in every part.

Divine are all his laws,
So simple O, so simple O!
Divine are all his laws,
With love for end and cause.

King Baby on his throne
Sits reigning O, sits reigning O!
King Baby on his throne
Sits reigning all alone.



FRENCH—A RIDE IN THE TRAIN

First line, French; second line, English word; third line, as we say it in English.

Nous montons dans le compartiment.
We mount in the carriage.
We get in the carriage.

On crie: "En voiture!"
One calls: "In carriagel"
One calls: "Take your seats!"



Un monsieur court—A gentleman runs.

Un monsieur court de toutes ses forces.
A gentleman runs with all his might.
A gentleman is running with all his might.

Il manque de tomber. Que c'est drôle!
He misses to fall. How it is funny!
He nearly falls. How funny it is!



En route—On the way.

Maman nous installe chacun dans un coin.
Mamma us settles each in a corner.
Mamma settles us each in a corner.

On ferme les portières.
One shuts the doors.
The doors are shut.

Le train part. Nous sommes en route!
The train starts. We are on way!
The train starts. We are on the way!



Papa et maman—Papa and Mamma.

Papa et maman lisent les journaux.
Papa and Mamma read the papers.
Papa and Mamma are reading their papers.



La poupée—The doll.

Nous jouons à la poupée.
We play at the doll.
We play with the doll.

Je suis le papa. Jeannette est la maman.
I am the Papa. Jenny is the Mamma.
I am Papa. Jenny is Mamma.

Bébé et la poupée sont nos enfants.
Baby and the doll are our children.
Baby and the doll are our children.

Nous les aimons beaucoup.
We them love very much.
We love them very much.



Bébé pleure—Baby cries.

Bébé pleure et fait le méchant.
Baby cries and makes the naughty one.
Baby cries and is naughty.

THE NEXT FRENCH STORY IS ON PAGE 4402.



WHAT MAKES THE KETTLE BOIL?

WE must know what it is that forms the bubbles when water boils. They are bubbles of water. If you hold a cold plate over boiling water you will find drops of wet water form upon it, though you can see no water passing upward between the surface of the boiling water and the plate.

The truth is that, though we always think of water as something that is liquid and wet, just as we think of air as something that is always a gas, we have no right to do so.

Water happens to be usually fluid, but we all know that when it is cold it becomes solid. Ice is simply solid water. And we must now learn that, when it is hot enough, water becomes a gas like air. Indeed, the air contains a quantity of water-gas, or water-vapor, as it is usually called, and when we find the weather close and muggy, as we say, it is usually because there is more of this water-vapor in the air than we like. When water boils, then, the bubbles are bubbles of water-gas, or water-vapor, and if this vapor strikes a cold surface, like a cold plate, it becomes liquid or wet again.

One of the things that decides whether anything shall be solid or liquid, or a gas, is heat; and so, of course, the simple answer to the question, What makes the water boil? is *heat*. We apply heat to water, and it

CONTINUED FROM 4135



begins to turn into gas, which makes the bubbles.

If we go on boiling the water, of course we boil it all away as gas, until there is none left. In an ordinary way water always begins to boil when it is at a certain *temperature*, or hotness, and this is called the boiling-point of water. It is not possible in an ordinary way to have wet water any hotter than this point, no matter how much heat you apply to it.

We said "in an ordinary way," because water can be made to boil without being nearly as hot as boiling water usually is. One of the things that decides the boiling-point is the pressure of the air, at the bottom of which we live. If you take water up to the top of a high mountain, where the pressure of air is much less because there is not so much air above you, and if you heat the water, it begins to boil when it is nothing like so hot as it needs to be made before it will boil at the bottom of the mountain. *On the mountain there is less pressure of air squeezing the water, and so it can more easily expand into bubbles of gas.* So, if you put an egg in the water at the top of the mountain, you may boil and boil as long as you please, but you will never boil the egg hard, simply because you can never make the water hot enough to make the eggs as hard as it can be made at sea-level.

HOW DOES A MUSSEL BUILD ITS SHELL?

The protecting shell of a mussel is built by a special part of its body called the mantle and especially the edge of the mantle. The surface cells at the edge of the mantle have the power of separating the carbonate of lime from the blood of the mollusc, and when the lime is thrown out to the surface it hardens and takes the form of a shell.

As the mussel grows its mantle grows, too, and the ever-widening edge deposits more and more lime as it expands. Any spine, scallop or irregularity of the shell corresponds with some irregularity of the margin of the mantle. Usually the shell can be divided into three layers, each made of thin plates running in different directions, and the inmost layer usually shines with rainbow colors, and is known as mother-of-pearl. The lime in the mussel's blood was originally in limy rocks, dissolved by rain and rivers, and washed down into the sea.

The mussel is a mollusc and all the molluscs have shells made in the same way out of limy material, though some are microscopic and some weigh hundreds of pounds. The two shells of the bivalve mollusc known as the giant clam sometimes weigh more than 500 pounds.

IS NIGHT AIR BAD FOR US?

There is an old idea that night air is dangerous for us to breathe; but this is nonsense. Night air is purer than day air. Fewer fires and furnaces are burning at night, and so the air in cities contains less carbon dioxide. Also, as there is less traffic, there is less dust in the air at night. We know exactly how the old belief as to night air arose, and the history of it is very interesting.

It was noticed that people who exposed themselves to the night air in certain parts of the world were very apt to get a serious disease which was supposed to be due to the quality of the air. So, long ago this disease was called *malaria*, which simply means *bad air*, and the disease is known by that name to this day. But we have lately found that it is due to the bite of a certain kind of insect which carries the microbes of the disease, and this insect is a kind of mosquito which bites only at night. By destroying this kind of mosquito and preventing it from breeding, malaria can be prevented. Even if

people with the disease come to a place where there is none, they cannot give it to others. It never develops except from the bite of a particular kind of mosquito.

So far as the air itself is concerned, night air is purer and better than day air. Thousands of people are killed by night air, but it is the foul night air which they have made in their own bedrooms, and have not allowed to escape. This weakens their bodies in such a way that the microbes of consumption can enter and destroy them.

WHAT CAUSES CRAMP?

Cramp is really a spasm or contraction of one or more muscles in a limb, or in the body. It may be very painful, or may be present along with numbness. We have, perhaps, often felt a sudden pain in playing some game or other when we are seized with cramp in a muscle, and this pain has, perhaps, passed off after a little vigorous rubbing. It may also be caused by overexertion and severe cold, and is probably due to some complicated change occurring in the muscle itself.

A sharp rubbing over the surface of the muscle will usually put it right; but, if we should happen to be seized with cramp when swimming, we can easily understand that it is very dangerous, because we must get to land before the cramp can be treated and the fact that we have been seized with cramp might prevent our doing so.

WHAT MAKES AN ARROW FLY?

The motion of the arrow through the air is a kind of power, and that, like all other power, has to come from somewhere. It was not in the arrow when it lay in the quiver, nor even when it was put in the bow; but when the cord was released and pushed the arrow forward the arrow got its power of motion.

The power, then, came from the stretching of the bow; for if the bow were not stretched it would not drive the arrow; and so, if we trace the power backward, we find it came from the strong muscles of the archer who bent the bow. But the question for us is, What happens in the bow when it is stretched? All we can say is that when the cord and the bow are bent out of their natural shape by being stretched, they somehow carry in themselves, ready to act, the power they have got from the muscles of the archer.

**IS IT A SIGN OF RAIN WHEN THE SMOKE
BLOWS DOWN THE CHIMNEY?**

It may or may not be. If we think about this question for ourselves, we shall see that no one could answer simply yes or no to it, for so many different things come into it. The traveling of smoke up a chimney and of wind down it are complicated matters.

We may be sure that when the wind blows down the chimney the air is not still, and wind very often brings rain, for wind is moving air, and this air may be full of moisture, which is apt to fall as rain.

But though wind and rain often go together, so that rain is more likely to fall when the smoke is blown down the chimney, yet there are winds which are usually dry, and bring no rain with them. Different chimneys smoke with different winds, and some smoke with all winds, and some with none; so, plainly it is impossible to answer this question, except in a general way.

**WHY CAN WE HEAR BETTER WHEN
WE SHUT OUR EYES?**

This statement is partly true and partly not true, according to what we mean by hearing, or, rather, according to what it is that we are listening to. If we are listening to music, which requires our attention, and our enjoyment of which depends upon our putting together in our mind what we have just heard with what we are actually hearing at the moment, and also with what we expect to hear a little later, then the fewer things our brain is doing at the time, the better; and we certainly enjoy the music more with our eyes closed, or with them just fixed vacantly upon nothing.

The only exception to this is when we are listening to music and at the same time reading the score. In such a case the shapes of the phrases, and so on, as they are seen by the eye on a page, help the ear to understand and enjoy the shapes of them as they are heard.

But it is very different when we are, for instance, listening to a tiresome lecture in a stuffy room on a sleepy afternoon. Instead of hearing better when we close our eyes, we shall soon find that we are not hearing at all! The brain must be more or less awake in order to hear, and where it might otherwise sleep, light pouring into the eyes will help to keep it awake. If we make experiments with

bright lights and sharp sounds, we find that either of them helps us to feel the other more intensely if they are going on at the same time.

**HOW CAN SOUND COME INTO A ROOM
THROUGH A WALL?**

When a sound-wave traveling in the air reaches a wall, it communicates itself to the wall, which is thrown into waves of exactly the same shape and number in each second, but of rather smaller size, for a little power is lost in transferring the waves.

The waves travel on through the new medium, as it is called, and then are conveyed by it to the air on the other side of it, just as the head of a drum, when beaten, shakes the air next to it into waves. In this second transference back to air again, a certain amount of power is lost, and so the sound is a good deal weakened in passing through the wall.

Of course, the extent of this weakening will depend on the thickness and on the material and structure of the wall. If we have materials like wool or sawdust or heavy curtain-hangings, which vibrate very badly and with much difficulty, they will absorb most of the sound-wave, and it will become faint.

**COULD THE SKY FALL
DOWN?**

The sky could not fall down because there is really no such thing as what we call the sky. It often appears to us as if we lived inside a great bowl turned upside down; the sun, the moon and the stars seem to be fixed in that bowl, and to be moved round as it moves. In all ages men have had this idea, and we refer to it in such a phrase as "the heavenly sphere."

But when the movements of the heavenly bodies were more carefully studied, it was supposed that there were more spheres than one at different distances from us. In a cloudy climate we cannot get so clear an idea of the sky in the form of a great sphere as it appears to men in other parts of the world.

If the sky were made like a great dome, we should indeed wonder what keeps it up. But what we see is only light reflected from the air and the dust in the air of our own earth. The blue looks very far away, but from forty to sixty miles, at the very outside, is the greatest distance from which the light is reflected by the air and dust to our eyes; and it is the effect of this reflection that we call the sky.

ARE WE HEALTHIER THAN OUR ANCESTORS?

Certainly we are far healthier. The death-rate has been falling all over the country for many years.

We know at what ages our ancestors commonly died—even those who had most wealth and knowledge. We know that, long ago, the children of our kings and queens died at much the same rate as the children of the slums do nowadays. We know that hideous diseases which once raged are now unknown or very rare. Only a generation ago, for instance, typhus fever was very common, and now it hardly causes any deaths in the whole of the nation in a year, though the disease is still sadly common in some countries.

Nothing is more stupid than to talk of the "good old days," as if everyone had been happy and wise and strong long ago. The more we learn of those "good old days," the more we learn how bad they were, and how much better off we are now; though our children's children will think us bad enough, when they have swept away alcohol and consumption and other terrible evils which we could abolish at any time if only we were wise enough.

WHY IS OUR RIGHT HAND STRONGER THAN OUR LEFT?

It is quite certain that the difference in *strength* between our hands is not natural, in the sense of being a thing decided from our birth, but is the result of the different treatment that our two hands have received since.

Difference in *skill* is another matter. There is a simple instrument, meant to be squeezed in the hand, which measures the strength of the grip of the two hands, and it shows that the right hand is considerably stronger in right-handed people and the left hand in left-handed people. So that we should really have added to our question the words "if we are right-handed." These differences between the hands do not exist if we use the two hands equally. Some children are very carefully looked after, to see that they become what is called *ambidextrous*, using both hands alike, and their hands are equally strong.

We see, then, that it makes a great deal of difference to our muscles how much they are exercised. There is no doubt that the difference in the strength of the two hands depends on the size of the muscles, for a tape measure put round the two forearms, or even a pair of gloves

put on, will often show the difference that use or exercise has made in the size of one hand or the other.

It is true of every part and every power of our bodies that they can be improved by use. On the other hand, it is no less certain that, for every part and power of the body or the mind of everyone, there is a limit which, if we are wise and careful, we may reach, but cannot pass.

HOW CAN THIN IRON RODS CARRY A SUSPENSION BRIDGE?

In the first place, it very much depends upon the iron. No one would trust very much to a suspension bridge made of any ordinary kind of iron. But if we *melt*—for that is what we really do—the right proportion of carbon in the iron, and get them to mix and hold together in the proper way, then we get a new kind of iron, which is vastly different and vastly stronger. It is this steel, as we call it, of which suspension bridges are made.

No one can say how or why it is that steel has the wonderful property upon which the building of suspension bridges depends. All we can say is that steel has a wonderful power of resisting anything that tries to extend or stretch it. This power of resisting extension is called tensile strength. The tensile strength of good steel is amazing, and in the last few years steels still more wonderful have been made. Thin wires of them will support enormous weights.

WHICH SIDE OF THE CLOUD IS THE THUNDER ON?

Thunder is the noise, an irregular wave in the air. Its cause is the very sudden heating of the air, high up above our heads, by the quick passage of electricity through it from cloud to cloud, or from a cloud to the earth. Air offers great resistance to the passage of electricity through it, and when anything resists the passage of electricity, that thing becomes hot. If it becomes hot, it expands suddenly, and so it starts the air-wave we call thunder. A sound—and the same is true of a light made at any place—spreads out, if it can, quite equally in every direction from the centre.

So the sound of the thunder spreads upward from the clouds, and sideways through the air and through the clouds themselves. The part we hear is the part that reaches our ears, part of the wave that spreads downward from the place where the electricity passed and started it.

DOES A HEN KNOW THAT CHICKENS WILL COME OUT OF HER EGGS?

One of the greatest of facts in the animal world is what is called instinct, and the mighty difference between our minds and those of the lower animals is that in us instinct has become largely changed into a much more wonderful thing which we call intelligence. One of the most important facts about an instinct is that the animal goes through the action without knowing what its purpose is, or what will come of it. If an animal could foresee the consequences of its acts, then it would be a reasoning and intelligent being, worthy to rank beside ourselves.

This is true of all instincts, that the action is done because something within the creature impels it to perform that action, but with no knowledge of its use and purpose. Thus, when a baby instinctively sucks from a bottle it does not know that the object of doing so is to supply itself with material and power for its life.

It may possibly be that in some cases an animal of the highest type, such as a dog, may notice, after a number of times, that certain consequences follow upon its instinctive actions, and so it may get to know what will happen, just as we do after a time when we exercise our instincts.

It is unlikely that the hen, whether the first time or the twentieth time that she sits, has any idea except simply that things like eggs are very good to sit on. This is true, even though she is glad to see the fluffy little chickens when they come out of the shells.

WHAT MAKES A WATCH GO?

The great law about power and energy, to which we so often have to refer, gives us the answer to this question. There is power in the spring, which gradually communicates itself to the wheels of the watch, turning them and making them move the hands that we see. After a time, perhaps hours, or even days, the watch stops, because the power of the spring has come to an end. It has spent itself in moving wheels, in moving the hands of the watch, in overcoming the friction at the places where the wheels and the hands are balanced, or pivoted, and in moving the air in the watch.

As no power can come from nothing, every imaginable kind of watch or clock must, sooner or later, have fresh power put into it from without.

The power was put into the spring when the watch was wound up. We wound it up with our muscles, spending force obtained from food, which, in its turn, obtained the force from the sun. So the sun really drives the watch. When we wind a watch, we feel that we are pressing against something. If it has quite run down, the first turn causes little effort to our fingers, but the last turns need more. What we are doing is simply coiling a spring tightly. It uncoils itself in a regular way, with the help of what is called a balance wheel, and so gives to the wheels of the watch the power we put into it. We can only say that when the spring is bent there is something in the arrangement of its parts which is the equivalent of power, and which can be turned into power.

WHY DOES A STICK MAKE A NOISE WHEN SWUNG IN THE AIR?

All kinds of noises, however different from each other, and all kinds of musical notes, high or low, full or thin, are really of the same nature in the chief respect that they all consist of waves of a certain kind, produced in the air as a rule, though they may be produced also in solids or in liquids. These sound-waves are of a special kind, and consist of a swinging to and fro of the tiny particles of whatever medium is carrying the sound—air, or water, or rock, and so on.

If air were not elastic it could not carry such waves, for the parts of the air pushed forward by anything would not swing back again, and so there would be no sound-waves produced. Therefore, if we want to interfere with the traveling of sound, we use wood or cotton-wool, or sawdust, and these things, not being very elastic, damp down the sound-waves.

Not until we know what sound is can we hope to understand the answer to this question, but when we have learned the main facts about sound, the answer is easy. Thus elastic air is disturbed when a stick is swung through it, for countless millions of atoms of the gases that make up the air are quickly moved aside to make room for the stick.

They strike the atoms next them, and, being elastic, they rebound. The atoms struck do the same, and for a little while all the atoms of the air are swinging backward or forward, and that motion makes the sound-wave which we hear as a humming noise.

THE NEXT WONDER QUESTIONS ARE ON PAGE 4397.

A FLOCK OF PIGEONS



Antwerp, Short-billed Turbit, Maggie and Blue Owl Pigeons.



The Homing Pigeon.



The Pouter Pigeon.



The Carrier Pigeon.



Short-faced Tumblers.



Fantail Pigeons.



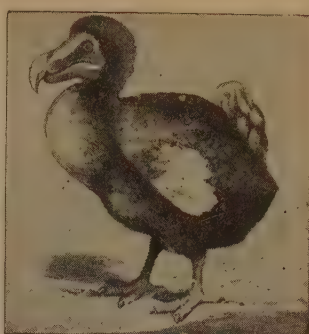
Homing Pigeons at rest outside their loft.



The Solitaire.



The Passenger Pigeon.



The Dodo.

THREE MEMBERS OF THE PIGEON TRIBE THAT HAVE NOW BECOME EXTINCT

THE PIGEONS AND THE DOVES

OVER the heart of a crowded city a bird comes swiftly flying, winds beating on it, smoke dimming its route, the noise of traffic and industries rising about it in seas of sound, terrifying and unnatural. Spires of churches, tall fuming chimneys of factories, miles of single-patterned roofs, scores of miles of streets, one like another as seen from the skies, are spread below the winged explorer.

The bird braves the wind, endures the smoke, ignores the crash and uproar ascending from the Babel; passes heedless over all streets save one, over all roofs but that which covers a poor house in a side street. And there, on the landing-board of a little cot nailed beneath the eaves, it alights and struts inside in urgent haste.

A homing pigeon has reached its house, the tiny dwelling set up for it by the creature who has become its lord, that tamer of wild things—the boy in threadbare breeches who sets aside his few weekly pennies to buy grain for the bird which is his very own.

Our little man repeats by his mother's knee at night the lesson he has learned by day from Genesis. Does he realize, we wonder, that this homing of his aerial treasure is a reproduction of the first recorded act of co-operation between man and the lower creation?

CONTINUED FROM 4130



The dove which returned to the Ark, bearing in its mouth the olive leaf it had plucked as a sign that the Flood had abated, was a pigeon; and the pigeon which wings its way in a dingy alley is a dove.

Our Anglo-Saxon forefathers called all the birds of this kind doves. We still use that name, but pigeons and doves are all one family, grouped in tribes and spread far and near about the earth. They are not to be found in Polar country simply because there is no pigeon food there, or the courage and hardihood of the birds would make a place for them there. They are vegetarians and eat immense quantities of grain and seeds. Nowadays cultivated fields count certain breeds of pigeons among the determined enemies of husbandry.

But the species number scores, even hundreds, not including the dozens of varieties of the domestic group beloved of fanciers. The family is gifted with such powers of flight and self-protection, and its numbers increase so rapidly, that at first sight we might think that the *Columbæ* family, to use its scientific name, is the most favored of feathered adventurers. But every rule has its exceptions, and three of the most notable of birds have vanished from this grand group. Man is responsible for each.

THE SAD END OF TWO BIRDS THAT LOST THE POWER OF FLIGHT

The Dodo and the Solitaire were both members of the family which have disappeared. There never can have been more clownish birds than these which lived in the peaceful mystery of the islands of Mauritius, Réunion and Rodriguez. The dodo was a plump and ponderous creature, swan-sized in body, but its wings, dwarfed by age after age of inaction, left their owner with as little idea of flight as a penguin. The solitaire was longer of leg and neck, and, like its cousin, a caricature. They were both simply exaggerated pigeons which had lost the power of flight.

Men found the dodo in 1598, and in a century had exterminated it. The solitaire survived in hiding in its native wilds, scarcer and scarcer, till the second half of the eighteenth century; then its career closed forever. We would give a fortune for a pair of either of these birds, but all the dodos and all the solitaires marched to doom down hungry, heedless sailors' throats.

THE WONDERFUL MIGRATIONS THAT ARE SEEN NO MORE

Until recently a writer on natural history, seeking an illustration of the matter of numbers in life, turned for a never-failing source of data to the marvelously numerous Passenger Pigeons of America. One could quote pictures of the birds during their migrations in search of nesting sites and food filling the air so that the sun was obscured for hours by their flocks, miles and miles in extent, speeding day after day to the chosen sites.

The approach of the mighty feathered army with a loud rushing roar and a stirring breeze, attended by a sudden darkness, might be mistaken for a fearful tornado about to overwhelm the face of Nature. For several hours together the vast host, extending some miles in breadth, still continues to pass in flocks without diminution. The whole air is filled with birds, their muting resembles a shower of sleet, and they shut out the light as if it were an eclipse. At the approach of the Hawk their sublime and beautiful aerial evolutions are disturbed like the ruffling squall extending over the placid ocean; as in a thundering torrent they rush together in a concentrating mass, and bearing in undulating and glittering sweeps towards the earth, at length again proceed in lofty meanders like the rushing of a mighty animated river. (Nuttall's Birds of the United States.)

What the yearly massing of the count-

less springboks among antelopes represented in mammalian life these annual troopings of the passenger pigeons represented among birds. A single nesting colony claimed every tree in the forests extending over an area twenty-eight miles long and from three to four miles wide. Each tree teemed with nests, so that as eggs gave rise to young pigeons the weight was often too much for a mighty branch to bear, and, in the words of our old song, "down would come babies, cradles, and all."

It was a sum of life expressed in millions and millions and yet millions of flying birds. Men multiplied in the wake of the passenger pigeons, and slew them from year to year with such un pitying greed and folly that the unparalleled swarms were thinned and thinned until fugitive flocks became straggling units, and, as we have seen, the very last passenger pigeon of all that uncountable multitude perished, the precious exhibit of the Cincinnati Zoölogical Park in the year 1914.

THE BLUE-ROCK WILD PIGEONS AND THEIR MANY KINDS OF DESCENDANTS

Such tragedies leave an ache in the mind of a student of these delightful creatures. For the credit of our kind, let us remember that man has helped to create as well as to destroy. We have eaten out of life three entire kinds of pigeon; but we have brought into being many times that number. Every one of our domestic breeds is believed to have been developed by man from the Blue-rock, a European pigeon which seems wild and untamable. Nevertheless, from it our pets have come as the result of years of selection and careful breeding.

A bird which returns to its home from a distance of hundreds of miles has the blue-rock spirit. The Fantail, white as snow, proud as a peacock as it struts and sprawls on the roof, is a changed blue-rock. The great Pouter, with his crop puffed up with air and insolence, and his legs and feet feathered as in bell-bottomed nankeen trousers, is of the same line. So are the picturesquely ugly Dragon and Carrier, with their bare, warty heads, looking as if they had thrust their beaks through clusters of fleshy mushrooms.

The Tumblers, which reel like acrobats in their midair play; the Highfliers, which keep the air in unwearying circles, displaying their mottled, pearly loveliness in the sunlight for eight hours at a time

without a descent for rest; the little Almond Faces, with their absurdly pretty short beaks; the long-faced, grim Scanderoons; the Jacobins, hooded in mysterious mantle and ruffle; the Turbits, with beaks like two cauliflower seeds set together, and with feathers folding like refractory petals on their breasts; the Trumpeters, sweet of note but muffled about the head with feathers like a Skye terrier with hair, and feathered about the legs like a shire horse with hair—these are simply fixed varieties to which careful selection by successive generations of breeders has brought the descendants of the blue-rock.

The perfect adaptability of the wolf and jackal to the conditions of human society has given us a multitude of breeds of dogs in our midst; the adaptability of the widespread blue-rock pigeon has given us hosts of tamed birds, many of them now incredibly unlike their free ancestors.

One has records of pigeons and doves living between twenty and thirty years, and a safe average is fifteen years.

THE HOMING PIGEON AS A COURIER FOR THE GREEKS OF OLD

Each breed has its admirers, and we are all secretly convinced that our own favorite is the best and the breeds of our rivals not quite worthy of our skill and affection. That is as it should be. But we all meet on common ground when we render tribute to the Homing Pigeon. The homing pigeon is the king of all the pigeon tribes we love. For clean-cut beauty none of the fancy domestic varieties we cherish can compare with the homer.

If ever a bird looked its part, this is the one. Everything in its make-up implies strength and swiftness; there is no fanciful feathering of the lower legs or feet, no pride-swollen pouch, no hooded eyes, no unlovely wattles to offer resistance to the air. A homer is as perfectly fashioned as we should make an airplane if we could, yet the homer is the nearest in design and coloring to the shy blue-rock.

These homing birds have made history. They were the swiftest of all messengers until electricity outran them. When Greece was the nursing mother of culture and the mistress of wondrous empires it was the homing pigeon by which she sent her news, sounded her alarms, wailed her defeats, trumpeted her victories. The names of victors in the Olympic Games were sent to every city by pigeon post.

THE LITTLE WINGED STEEDS IN PEACE AND WAR

From that day to this the homers have been man's couriers of the air. The messenger-bird has its message written on thin paper inclosed in a tiny quill attached to its leg; the racer, set free in strange territory, has its goal in a nest of straw in some remote pidgeonry. Both rush through the troubled air with their own speed added to that of a gale which favors, or fight against a gale which opposes them.

Their speed in still air is thirty or forty miles an hour; a friendly wind lends its own pace as an addition to theirs; a hostile wind subtracts. With a velocity like this our pigeons might visit the shores of Europe in less than three days. Associated with the swiftness of flight is extraordinary keenness of vision, or otherwise the object of its motions might be lost. Thousands are interested in these birds. What the Arab steed is to the horse-loving son of the desert the faithful homing pigeon is to the townsman and villager who nurture and train these birds.

THE POWERFUL MUSCLES THAT ARE LIKE A LIVING MOTOR

The power of flight comes not only from the wings, but from the immense muscles of the breast—living motors for the pinions. This mass of muscle on a pigeon's breast amounts to a quarter of the entire weight of the bird.

In one respect these creatures remind us of the ruminants, the animals which chew the cud. They can gorge their great elastic crops with a weight of food actually greater than the weight of their bodies, fly far away to safety, and rest while the tough membranes of the gizzard, or stomach, aided by grit and stone, grind the hard grain to pulp.

There is a wonder of production in that crop of the pigeon. When the parent birds have young ones in the nest the crop glands become enlarged and secrete a nutritious fluid which we call pigeon's milk. On that the babies are fed till they are old enough to accept grain.

Even when that stage is reached, however, the youngsters are not fed with the food in its natural condition. The old birds swallow it, soften it, and add fluid to it, and then, putting their beaks into the beaks of the squeaking nestlings, pump the half-digested grain down their

throats. The writer has from time to time brought up by hand orphaned little pigeons, feeding them on soaked corn. The young ones responded to the treatment, but when mature they never matched the size and strength of those naturally reared.

THE MYSTERY OF THE BIRD THAT DRINKS LIKE A HORSE

Such birds live on, and mate, and reproduce their kind, and suggest that from their like we might evolve a dwarfed variety of pigeons. But for the divergence from the normal among the untamed species it is not so easy to account. Many a chapter of mysterious evolution is hidden in the little things and great which distinguish one species of pigeon from another species and from all the rest. How interesting it would be to discover how pigeons learned to drink differently from other birds!

They suck up their fluid like a horse, and satisfy themselves at one draft. Such a method of drinking in time and position of peril must be a most valuable asset to a bird, and the trait must many a time have turned the scale in favor of life when to pause long over drinking in the neighborhood of danger would have meant death.

In physical features, too, there are differences impossible to explain. There must be a definite advantage in the short legs and broad soles of the feet of the Wedge-tailed Green Pigeons, or we should not find such great numbers of these birds in Africa, sunny Asia and the warm islands of the ocean. What is the corresponding peculiarity of the Walia Pigeons of Abyssinia? It is not revealed to the eye. The fact that these birds flourish exceedingly in a subtropical area, rarely less than 2,000 feet above sea-level, and never more than 6,000 feet up, shows that appetite has determined their prosperity. They are fruit-eaters, and their home teems with wild figs, so there in the midst of them are the Walia pigeons. About half the pigeons belong to the fruit-eaters.

SOME BEAUTIFUL MEMBERS OF THE GREAT PIGEON FAMILY

Then we have a number of green species in southeastern Asia and the Malay Archipelago, much like the Thick-billed Green Pigeons, yet not of their group. They are closest kin of the type species, the green pigeon, which belongs especially to Malabar, and so take the specific

name from that one. This group has not the Malay Archipelago as a private hunting-ground, for the Painted Pigeons which gladden the eyes of nature-loving Australians are there too. Seemingly only a step in structure from the green pigeons, they are smaller but gem-like in their feathering.

Many of them possess an extravagant luxury of beauty. All the colors of the rainbow go to adorn them, always harmoniously combined. The softest lilac, silvery gray tones, blue as a Mediterranean sky, golden shadings, deep-sea green, red, purple, bronze, shimmering steel gray—these are the tones in which Nature has delighted to paint these fair children of hers. It is a poor pigeon which does not carry a metallic sheen on its handsome graceful neck; but the painted darlings of the tribe have lustre and loveliness combined in such measure as to charm the eye as music and poetry charm the intellectual senses.

THE DOVE THAT MAKES ITS HOME IN A RABBIT BURROW

The Golden Pigeons are as splendid in a less varied color-scheme, and there is gracious coloring, too, in the Wart Pigeons. Nor is beauty denied to the many species of Fruit-pigeons, of which the Nutmeg Pigeon is peculiar as having only one egg to a nest.

So far we have dealt with the tropical species among the wild ones, but now we must glance at more typical examples, headed by that wonderful ancestor of multitudes, the rock-dove, or blue-rock pigeon, already named. Though most wild pigeons build nests in trees, the European Stock-dove has the habit of making its home in rabbit burrows when the soil is light and sandy, or crouching like a pheasant beneath a bush.

The European Wood-pigeon, or Ring-dove, however, is true to family traditions in making its nest high up in the trees. This bird is the largest of European wild species. Only the domestic Runt, a monster of the home dovecote, compares in size with it. Recently wood-pigeons have taken up their residence in London and appear to grow larger than in the country.

In the country, however, the wood-pigeon is a brigand much hated by the farmers. Two things are against it—its vulture-like appetite and its overwhelming numbers. It does enormous good in eating multitudes of injurious seeds; but

against that we have to set the unquestionable fact that it plays havoc in the fields. It eats great quantities of grain; it snaps up the growing green of root crops; it pillages the fruit in our gardens and orchards.

The fruit-pigeons proper are noted for their huge mouths, but one would like to add a personal note to the literature of the wood-pigeon by showing that this

is capable of great affection, not only to its mate and its young, but to a human friend.

THE TIMID AND LONG-TAILED DWELLERS IN THE DENSE FOREST LANDS

So far we have considered pigeons in which the wings are longer than the tail, but, passing on, we meet a great assembly of birds, South Asian and Pacific Islanders, which have the tail longer than the



The Crowned Pigeon.



The Tooth-billed Pigeon.



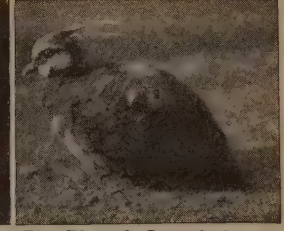
The Wonga-wonga Dove.



The Nicobar Pigeon.



Blue-rock Pigeons.



The Plumed Ground-pigeon.



Turtledoves.



The Stock-dove.



Wood-pigeons.

bird, too, has ability to eat. One autumn afternoon an observer saw a wood-pigeon gobble down eleven crabapples in succession, each large enough to choke a man to death. There is a suggestion of the snake in this prodigious swallowing capacity of the ring-dove.

Great Britain suffers, not only from the appetites of those wood-pigeons which remain all the year, but also from huge flocks from the Continent which fly across the North Sea every autumn and do immense damage to the crops. The wood-pigeon's note is very melodious, if monotonous, and the bird, so shy in the wilds,

wings, and so are called Long-tailed Pigeons, another name of the group being Cuckoo Pigeons. The passenger pigeons, though belonging to the New World, and therefore far removed geographically from the remainder, had unique long tails. These were fatally fearless creatures of the wilds, but the long-tailed pigeons of the Old World are timid, nervous dwellers in thick forest land.

We reach the extremity of either fearlessness or stupidity in another great section called the Mourning Doves from their melancholy note. From their habit of nesting on the ground these doves are

termed Ground-pigeons. America has several species of them in her temperate areas, where the birds, wiser than the poor passenger pigeons, never assemble in great flocks even at migration time, but group themselves in family parties, so that if disaster befalls one section, others continue unharmed.

THE LITTLE TURTLEDOVE THAT APPEARS IN SOLOMON'S SONG

Though our mourning dove is often called the Turtledove, the name properly belongs to a bird of the Old World. The Turtledoves are included among the ground-pigeons. They are to be distinguished by the black or dark collar of feathers traversing the back of the neck. They fly with the same agility among tangled boughs and dense foliage as bats among thronging obstacles. Ranging across Europe and on into Asia, the turtledoves are favorites everywhere. There is no sweeter verbal music in all the Song of Solomon than that in which he has this bird in mind:

For lo, the winter is past, the rain is over and gone; the flowers appear on the earth; the time of the singing of birds is come, and the voice of the turtle is heard in our land.

The charm of the bird's name is spoiled for us by its misapplication to a sea reptile. The turtle which comes to table was originally called the sea tortoise, but this word has become corrupted into turtle, so that many a child, when it first learns its Bible, imagines that in Solomon's day the turtle of the soup sang songs to cheer the heart of the Eastern king.

Which strain gives us the little turtledoves sometimes kept in wicker cages about the house? Nobody knows. They are cited as the very pattern of fidelity and affection, but the fact is that these little turtledoves quarrel and peck and pluck each other's feathers with a hearty animosity.

THE FEW PIGEONS OF NORTH AMERICA

Strange to say, temperate North America has few of the many species of pigeons and doves. Of course there are millions of tame pigeons, and we have already spoken of the passenger pigeon and the mourning dove. There is the Band-tailed Pigeon of the Pacific coast, which has a black bar across its bluish tail. It is shown on page 5144. Eight or ten other pigeons and doves that belong to the

warmer regions of the South are sometimes found in the southern part of the United States. Among them are the Inca Dove of Mexico and Texas, the Ground Dove, a small bird which lives chiefly upon the ground, and the White-winged Dove, another southern species. The White-crowned Pigeon of Mexico and the West Indies is also to be found in great numbers in Florida on the rocks of the Florida Keys. Here it breeds and feeds chiefly on the beech-plum and the berries of one of the palms. Because of its choice of breeding-places it is known as the Rock Pigeon. In the Bahama Islands it forms an important article of food. The nest is built at the end of a cactus shoot or on the upper branches of a mangrove. It is composed of small twigs and lined with grass and fibrous roots.

A bird very wonderful in one way fitly ends our procession. It is that strange creature the Tooth-billed Pigeon. The bill is a great, strong, heavy contrivance, massively hooked as to the upper mandible. If we study this beak, we see that it is suggestive of the comic beak of the extinct dodo. The tooth-billed pigeon is, in fact, the nearest surviving relative of the dodo.

THE CHANGE OF HABITS THAT HAS SAVED THE TOOTH-BILL FOR US

But the living tooth-bill is wiser than the dead dodo. Restricted to the Samoan Islands, it was accustomed in earlier days to feed on the ground and to roost at night on low stumps, where it could easily be reached by the animals introduced by man. But a great change has come over the habits of the bird. It no longer seeks a table at ground level, but obtains its food in the trees. It no longer perches for its slumber on modest heights, but roosts each night as high as shelter can be obtained in tall trees. The change has saved its life: the threatened birds abound to-day, and the species is saved.

That is as instructive as the change in the habits of the kea parrot, but much more pleasing. The tooth-billed's kinsman, the dodo, could not have done anything so effective, for he parted with his birthright—the wings which make pigeons fearless of all but a gun, which have given them command of nearly all the habitable world, and rendered them willing helpers of man in bridging the gulf and spanning the void in flight.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 4363.

The Book of THE EARTH



This peaceful scene is made up of countless millions of electrons giving off boundless energy.

HOW THE ELEMENTS ARE BUILT UP

THE chair on which we sit, the table at which we write, seem solid enough. It is only when science casts its magnifying eye on them that it perceives them to be made up of particles so small and so far apart as to be transparent.

To the eye of science the densest bit of matter is no closer set with its fragments than the sky with the scattered stars. Those stars will help us with our picture of matter as the scientific man sees it. Some, as we know, are single stars, some double or treble. Many must have companion globes, though we are not able to perceive them. All of them are moving—turning, spinning, whirling.

So it is with the fragments of matter. They, too, are never still. They also are now single particles, and at other times are so bound together as twins or triplets as to appear one body. The systems that were bound together as one particle were once called molecules; those that walked by themselves were atoms. In chemistry it was said that a molecule of any kind of matter was the smallest possible amount that could exist as a combination (or in companionship); and that an atom was the smallest possible amount that could stand alone. However much you might break up matter, you could never break up an atom: it was indi-

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visible, unchangeable. So far as most laws of chemistry go, that idea

still satisfies the working principles; but it will not do for the physical chemist, who has been led, by the powerful hand of electricity, to examine the atom, and to perform the impossible—that is, to split it up, and even to alter it. The new atom is like a sun with attendant planets, and the sun is called the nucleus of the atom and the planets its electrons.

As for its size, remember that we have compared the electrons flying around a nucleus of the atom to planets revolving about a sun. But by comparison the electrons are farther away from their sun, the nucleus. Nucleus and electron together are about a hundred thousand times smaller than the whole atom. The hydrogen atom has been taken as an example because it is the simplest of them all; it has a nucleus and one electron. Other atoms have more electrons.

But let us look with our mind's eye at any atom and we shall see it growing less and less substantial, its solidity disappearing and being replaced by fragments that are so small and so far apart that they scarcely can be thought of as matter at all. Yet they are flying so fast that some tremendous power must be working in them; and thus we come to the place where the matter

of which they are built cannot be clearly distinguished from the forces which give to them perpetual movement. In a word, we come to where Matter and Energy are one.

EVERYTHING ABOUT US BUILT UP OF COUNTLESS NUMBERS OF ELECTRONS

For the time being, the path ends there. The future may find a path beyond, which will tell us how Energy itself, and the forces of which it is the manifestation, come into existence, and why they should congregate to form atoms and the substance of worlds. We need do no more here than retrace our steps along the path and look at one of those worlds made up of electrons—the world around us.

The books on the table, the coal in the grate, the glass in the window, the electric lamp, the pen in our hand, our hands and ourselves are all made up of those electrons. We are the playgrounds of uncountable numbers of electrons all flying at terrific speeds about some electron-built nucleus larger and heavier than themselves. The pen, the ink, the window, the coal, the grate are all built up and sustained in that way. Then what is it that makes the difference between flesh and blood and iron and glass? The answer is clear to everyone. Flesh and blood must be built up of atoms different from those which build up iron or glass.

WHAT THE X-RAY AND RADIUM PARTICLES HAVE TAUGHT US OF THE ATOM

We must now state as simply as we can what makes one atom differ from another. The inquiry has been very long; it has occupied the minds of some of the greatest intellectuals of science for nearly fifty years. It began when Sir William Crookes sent electric discharges through those little vacuum tubes from which all, but never quite all, the gas had been exhausted, and when he, with an almost miraculous insight, declared that the glow which appeared was something between matter and energy. That was in 1879, and the inquiry is far from finished.

In this inquiry men have, with wonderful ingenuity and patience, found ways of counting the electrons which no eye can ever see, of tracking their paths and finding their speeds, their size, their weight. We cannot here follow them in all their researches, in all their trials, failures and successes, or inquire into the reasons for their beliefs, or speculate on their plans

and hopes for the future. We can only state what, in the best of their judgment and belief, is true. To that we may add that the new science of the atom is founded on the ways of examining it which have been lighted by the X-ray, and the particles which fly off from radium. The atom was for so long supposed to be indivisible because no chemical action would break it up further, and ordinary light glanced off it. But the X-ray and the particles flying off from radium so often went through it as to make one believe that there was no particle of matter which could not be penetrated by some other particle!

With these tools of exploration—the X-ray and the particle from radium—the safe of the atom was opened. When science looked therein it found, what many had suspected but none had been able to prove, that all atoms were built up of the same thing or things, and that one atom differed from another only because of the different arrangement of these things in its interior.

THE TWO KINDS OF ELECTRICITY FOUND IN THE ATOM

The things are the nucleus and the electrons. These two have been compared to a sun and the planets, but whereas the force which drives the planets round the sun is said to be gravitation, that which sends the electrons round the nucleus is electricity.

Everyone is familiar with the terms positive and negative electricity, but such terms are used for convenience only, because no one can say what is the difference between them except in the way they behave in one another's presence. If anybody should further ask what any kind of electricity is, we could only reply that electricity is not a thing at all, but a way in which things behave. Each kind of electricity attracts its opposite, so that positive attracts negative and negative thrusts away negative; and that is the sort of behavior which drives the machinery of the atom.

In the middle of the atom is the nucleus, which, at its simplest in the atom of hydrogen, is just a hydrogen nucleus loaded with one kind of electricity and one electron of another kind of electricity dancing round it. For convenience we say that the electron is always loaded with negative electricity; so that the nucleus is charged with positive. This

hydrogen nucleus is called the Proton, from a Greek word meaning "foremost." The same Greek root is found in the words prototype and protoplasm.

THE FOUNDATION STONES OF THE ATOMS OF ALL THE ELEMENTS

It is not easy to examine a nucleus, and sometimes the nucleus of other atoms has not disclosed its structure to the safe-breaker; but as far as is known, the nucleus of all the atoms, from hydrogen to oxygen, from oxygen to iron, from iron to uranium (the heaviest of them all) is made up of hydrogen atoms as foundation bricks cemented together with charges of positive electricity. The greater the number of charges of positive electricity used to cement the bricks, the greater the number of charges of negative electricity (or electrons) dancing round the nucleus. The electrons are all of the same weight in every atom; it is the nucleus to which we look for differences in the atom. The nucleus gives the atom its weight.

A simple nucleus like that of hydrogen could do with one electron. The more ponderous oxygen wants 8. The weighty iron demands 26. Wealthy gold can afford 79, though this is one electron less than mercury's 80. Remember that, with all these electric charges of a negative kind, the positive nucleus is reinforced to support them.

The discovery of the nineteenth-century chemists before electrons were thought of was that all substances that were known could be split up into elements, and that, however much these elements were split up, they would always be resolved into atoms peculiar to that element. One element differed from another because its atom was different, but each element's atom always remained the same.

THE ELEMENTS THAT STILL REMAIN TO BE FOUND

To the number of these elements discovery has continually added new ones. The last was found in Copenhagen on January 23, 1923, and was named hafnium. That brought up the number to 88; and it is believed that there are four more to be found, which will bring the total of the elements up to 92. Even that may not be the limit of possible elements; some still heavier may yet be found. They can be first divided into two broad groups, the metals and the non-metals.

First of all, these elements were arranged in the order of the weights of their atoms. Hydrogen, the lightest, came first; helium, also a gas, would be placed second, though it was not found on the earth till the twentieth century; carbon would be 6th, nitrogen 7th, oxygen 8th, phosphorus 15th and so on, to the metals—iron, 26th; iridium, which is used to tip the nibs of fountain-pens, 76th; and platinum, now one of the most expensive metals, 78th.

But in the last century chemists began to find that this kind of arrangement did not bring the elements into any sort of relationship with one another. An element would resemble in its properties not the elements which were next to it in the weights of their atoms, but some element quite a long way from it in such a table. Thus, carbon was nothing like its near neighbors nitrogen and oxygen, but was like silicon, which was eight places away. So nitrogen was not like oxygen, but like phosphorus, also eight places away, and oxygen was like sulphur, again eight places distant.

WHY THE ELEMENTS ARE ARRANGED IN DIFFERENT GROUPS

This suggested to Mr. J. A. R. Newlands a scheme of arranging the elements in octaves, and though his scheme was at first ridiculed, it was the basis of what is called the Periodic Table of the Elements, which was framed by the Russian chemist Mendeleef, and also, at about the same time, by the German Lothar Meyer.

This table has been revised from time to time as new discoveries were made or mistakes corrected. The elements as a rule, though the rule is not invariable, still follow one another in the order of their atomic weights, but they are arranged in periods and groups.

For example, there is a group of elements called Alkalis, or alkaline metals—lithium, sodium and potassium. These are the 3d, 11th, 19th in the table, and are all very much alike in their chemical behavior. Next to them is a group of Alkaline Earths—beryllium, magnesium and calcium, which are 4th, 12th, 20th. There are altogether eight groups, and the last of them consists of six gases found long after Mendeleef's time, all of them curiously alike—helium, neon, argon, krypton, xenon and radium emanation. They are called the inert gases because they cannot be got to combine with any-

thing. The German chemists called them "noble" gases, because they refuse to have anything to do with other elements inferior to themselves. They are far separated in the weight of their atoms, for, while helium ranks second to hydrogen, the others follow as 10th, 18th, 36th, 54th, and radium emanation is 86th.

Besides being arranged in columns of groups, the elements are arranged in rows of periods. For example, following hydrogen there is a row of helium (2), Lithium (3), beryllium (4), beryllium (5), carbon (6), nitrogen (7), oxygen (8), fluorine (9); and below it a row of neon (10), sodium (11), magnesium (12), aluminium (13), silicon (14), phosphorus (15), sulphur (16), chlorine (17).

The first element in the first row, helium (2), is like the first element in the second row, neon (10), and in the same way lithium (3) is like sodium (11), and so on.

There are seven of these periods in the table, but they do not all contain the same numbers of elements. The seventh period, which contains radium, actinium, thorium and uranium, is incomplete: perhaps the gaps can never be filled because if elements were found to fill them they might break up.

THE ATOMIC NUMBER AND WHAT IT TELLS US OF THE ELEMENT

It will be seen that in the two rows of periods each element has a number. That number indicates not the weight of its atom, but merely its place in the table. It is called its Atomic Number; and these atomic numbers again have been doubly useful. In the first place, they have been instrumental in showing what chemical properties an element should have because of its relationship to other elements in its group or period; and in the second place, they also show how that element may have been built up.

But the atomic numbers have another use. Hydrogen is numbered 1 and has one electron moving about the nucleus of its atom; helium, which is second in the table, has two electrons; oxygen is eighth and has eight electrons, and so on through the metals. Iron is numbered 26, with 26 electrons; gold is numbered 79, with 79 electrons, and so on. Each element, as it follows another in the table, adds one more electron to its system.

Here, finally, is the wonderful truth which the science of our century has made

clear; that although there may appear to be 88 or 92 elements as different from one another as hydrogen or gold or radium, yet there are not 92 different kinds of matter, but only one. The elements have all been built one after another from the one kind of matter, to which long ago the name of "protyle" was given. It is now believed that this is electricity.

The electrons are still moving. They move around the nucleus, as has already been said, like planets around a sun, but the image is far from complete, because their speeds are enormously greater than those of any planet and are continually altering. More than that, the electrons move, not in circles, but often in flat ellipses, continually changing their orbits and directions. There are, as in our solar system, rings of outer planet-electrons, and of inner ones, but they can change places. Imagine a solar system like that which belongs to the element uranium, with 92 planets, some of them sometimes whirling round at the rate of 150,000 miles a second and many of them at 50,000 miles a second; and imagine that they are continually influencing, yet never interfering with, one another.

THE FEW FORMS OF MATTER AND THE COUNTLESS ATOMS THAT MAKE THEM

Imagine, if you can, the wonderful structural work which must have been demanded to frame that ever moving scaffolding of an atom; and then remember that while there are no more than 92 of these arrangements of scaffolding in the whole vast architectural scheme of this atomic universe, the number of atoms in this universe is beyond our counting.

What does this all mean? During the Middle Ages men were constantly searching for the "philosopher's stone" by which they hoped to be able to change other metals into gold. When we learned a little more about chemistry we laughed at the alchemists, as these dreamers were called. In 1925 a reputable chemist announced that he had been able to change mercury into gold. No one laughed at him, for chemists now believe it to be possible. To be sure, the cost was greater than the worth of the gold, but it is interesting to think that the dream of the old alchemists was not so foolish as we thought. However, the task is so difficult that it was impossible without the appliances of the present day.

The Book of Familiar Things

WHAT THIS STORY TELLS US

A CABLE which is to run under the ocean must be much stronger than a telegraph wire which is strung upon poles. The weight of the cable with its layers of wire, and the substances put around to keep the water out, is very great. The cable lies on the ocean floor sometimes as much as four miles from the surface of the water. Though many messages are now sent by wireless, the cables are still busy, for they can be used at all times, while the conditions of the atmosphere sometimes prevent the sending of wireless messages. Then, too, a wireless message may be picked up by other instruments, while a cable message is known only in the sending and receiving offices. This secrecy is sometimes very important in business, and also in the affairs of government. Great damage might be done if another party got possession of the information intended for one person or one country alone. Cables therefore are not likely to go out of use.

THE WIRE THAT RUNS UNDER THE SEA

ALTHOUGH the first wire under the sea was laid within the memory of many men yet living, there are to-day over 242,000 miles of submarine cable linking up all the continents. These lines bring East to West and North to South in a way that our ancestors would have called magical. In one day twenty thousand messages can be sent through a cable at the rate of from fifty to one hundred words a minute. The story of the submarine cable is interesting.

The faster and farther we ourselves travel, the faster must our messages go. Therefore, when steamships began to cross the ocean, men began to wish for a method whereby news could travel still more rapidly across the waters. We read on page 1243 how men discovered electricity, and we can understand how the way was prepared for the telegraph cable which runs under the sea. Here we shall recall the trials of the man who laid the first cable under the Atlantic, enabling us to have immediate communication with England. The man was Sir Charles Tilston Bright, who gained his great triumph when he was only twenty-six.

Other men had tried to solve the problem. Sir William O'Shaughnessy Brooke succeeded in 1838 in sending

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messages over a wire which passed through a river in India. Professor Samuel F. B. Morse, who gave America her telegraph, and whose system of signals for telegrams is everywhere used,

sent messages through a copper wire laid in the water of New York harbor.

Next, an American named Ezra Cornell got a cable to work through twelve miles of water. That was in 1845. The cable worked well for some months, but was then broken by ice. Cornell deserves to be remembered as the man who founded Cornell University. In 1846 an Englishman named Charles West tried to lay a line from England to France. He got as far as Portsmouth harbor, where, holding the end of his cable in a boat, he sent messages by it to the shore. Poverty prevented him from carrying out his scheme.

The first real success was a curious one. The cable was laid for two miles in the waters of the English Channel in January, 1849, then brought to land at Folkestone and joined to a wire on land 83 miles long. It carried messages to London and back to the ship at sea which held the end of the cable.

Many minds in England and America were now fixed on the idea. In America, Cyrus West Field, who

had made a fortune as a paper-manufacturer, was doing all he could to promote schemes for a cable from America to England, and had formed a company for the purpose. In Great Britain, Jacob and John Watkins Brett, two brothers, were trying to get the Government's permission to start a cable between England and France. After much annoying delay they got a cable laid from Dover to Calais, entirely at their own expense.

The ship with the cable started in August, 1850, and the wire was soon landed at Calais. Messages were sent over it by Queen Victoria and Emperor Napoleon III. But the cable suddenly snapped: an ignorant fisherman had dragged it up with his nets and broken it in the belief that it was a new kind of seaweed! A new one was soon laid, and others linking other places followed.

People had by this time ceased to regard the cables as seaweed, or to believe that to make signals they had to pull at the cables like bell-wires. So now there was a serious proposal to lay a cable through the Atlantic. Of course the wise men said that the thing could not be done. Sir George Airy was one of the most confident of the opponents. It was impossible, he said, to sink a cable to the bottom of the deep sea, and, if it were possible, such a cable would not convey signals. Well, the Bretts met Cyrus Field, who went over to England, and they formed a company and instructed Charles Tilston Bright to carry out the work of joining Britain to America by telegraph beneath the ocean.

HOW THE CABLE SNAPPED IN MIDOCEAN AND LAY BROKEN UNDER THE SEA

It was on August 5, 1857, that one end of the cable was brought ashore near Valentia, Ireland. The next day the expedition set off. The British Government had supplied two ships and the American Government had supplied two.

After a bad start the ships got 380 miles out; then the cable suddenly snapped, and the two ships had to return to Plymouth leaving the broken cable at the bottom of the sea. It was necessary to raise more money to buy 900 miles of extra cable—a terrible expense. The money was found and the cable bought, and in June, 1858, the ships started off again. When they got out into the Atlantic they encountered a frightful storm which lasted a week. Many men were

injured, and the ship was so badly strained that again and again she almost sank. This time the ships started by laying the cable from midocean, one going toward Newfoundland and the other toward Ireland. But repeatedly the cable broke, owing to the bad workmanship of those who had made it.

HOW A QUEEN'S MESSAGE FLASHED ALONG A WIRE FROM ENGLAND TO AMERICA

The second voyage was a failure, and blank despair reigned in England. However, a few steadfast friends bore up under the blow. They got more money and sent out another cable. Again the ships carrying the two halves of the cable parted in midocean, and this time each arrived at its destination carrying the land-end of the cable with it. Thus one half was drawn up on dry land at Valentia, where the first expedition had started, and the other was landed at White Strand Bay, Newfoundland. The Englishmen who had found the money on their side of the ocean cabled to their friends who had found money in America, expressing their joy at the success which had come to them.

Then the first public message was sent from Queen Victoria to the President of the United States. The cable lasted long enough to prove that messages could be sent by electricity under two thousand miles of sea. In all, 271 messages were sent; then, after two months, the cable ceased to work.

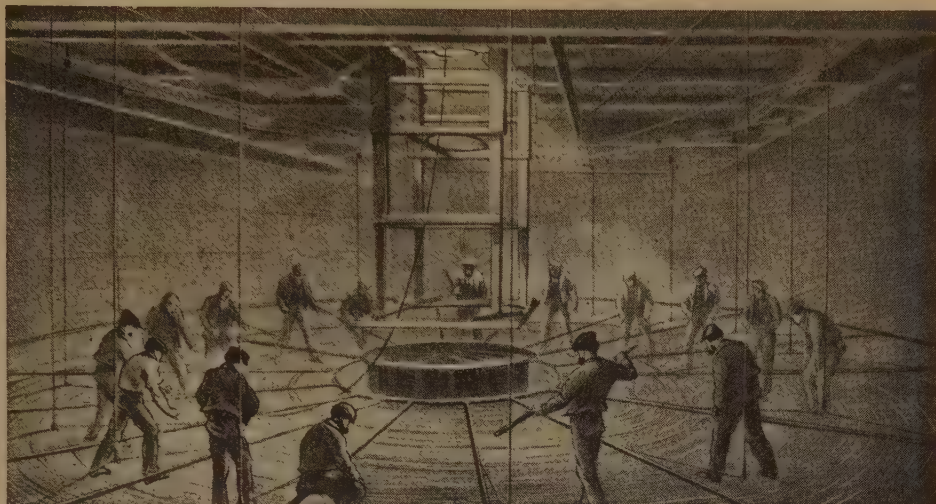
During the next two years a new company was formed, and in 1865 the Great Eastern, the largest ship built up to that time, set sail with yet another cable. This time a much stouter cable was employed. It was 2,300 miles in length and weighed many tons. But again trouble followed, for the cable broke.

THE CABLES THAT CARRY MESSAGES ALONG THE BEDS OF ALL THE OCEANS

Still another cable was sent out, and this was finally got across, Ireland and Newfoundland being connected by it on July 27, 1866. In the following year the cable 1,100 miles long lost by the Great Eastern in the preceding year was found, and, a fresh section having been added, a second cable to Newfoundland was completed.

Sir Samuel Canning had charge of the engineering work in the Great Eastern cable-laying, but Sir Charles Bright was the company's adviser, and we may

LAYING A CABLE UNDER THE SEA



No ship but the Great Eastern could have carried the 2,300 miles of covered wire required for the Atlantic cable. It was stored in three enormous tanks, which were filled with water to keep the cable from getting too hot or too cold. Here we see the cable passing out of one of the tanks as it was being laid.



The first cable laid by the Great Eastern broke, and was grappled for five miles under the sea. When found, a buoy was let down to mark the spot.



The lost cable was found by dragging over the bottom with iron hooks. Here we see men preparing to lower the grappling-iron.



After many failures the lost cable was found. There was much anxiety as the end was hauled up from the bottom of the sea, but just as it came into sight it slipped away, and all the work had to be done over again. Here we see the scene when the cable was brought on board.

in a way regard him as the father of Atlantic cables. But we must not forget the energy and the perseverance of Cyrus W. Field, who was never willing to give up.

Some of the great transatlantic cables stretch across the bed of the ocean for a distance of over two thousand miles. Seven hundred tons of copper are used in an Atlantic cable, and 350 tons of gutta-percha are used to insulate it. The cable conducting the currents usually

new devices have added to the wonder of this wonder of the world. The signals sent through the first cable were faint and sometimes difficult to understand. In 1867 Lord Kelvin invented what was called a siphon recorder, to make signals stronger and clearer. It also enabled the speed in sending messages to be increased.

When the first messages were sent, the greatest speed was only about six words a minute; through the Atlantic cables to-day the average is fifty words a minute,



The cable is carried from the shore to the central cable office, but there may be several intermediate stations where messages can be received. In this room the cable is tested to see if it is in working order.

consists of a strand of seven copper wires inclosed in a layer of gutta-percha, and this is known as the "core." To protect the core from damage and give it strength, it is covered by mild steel wires wound round it in spiral fashion, known as "armor wires." Outside the wires are two windings of jute, tarred and covered with soapstone.

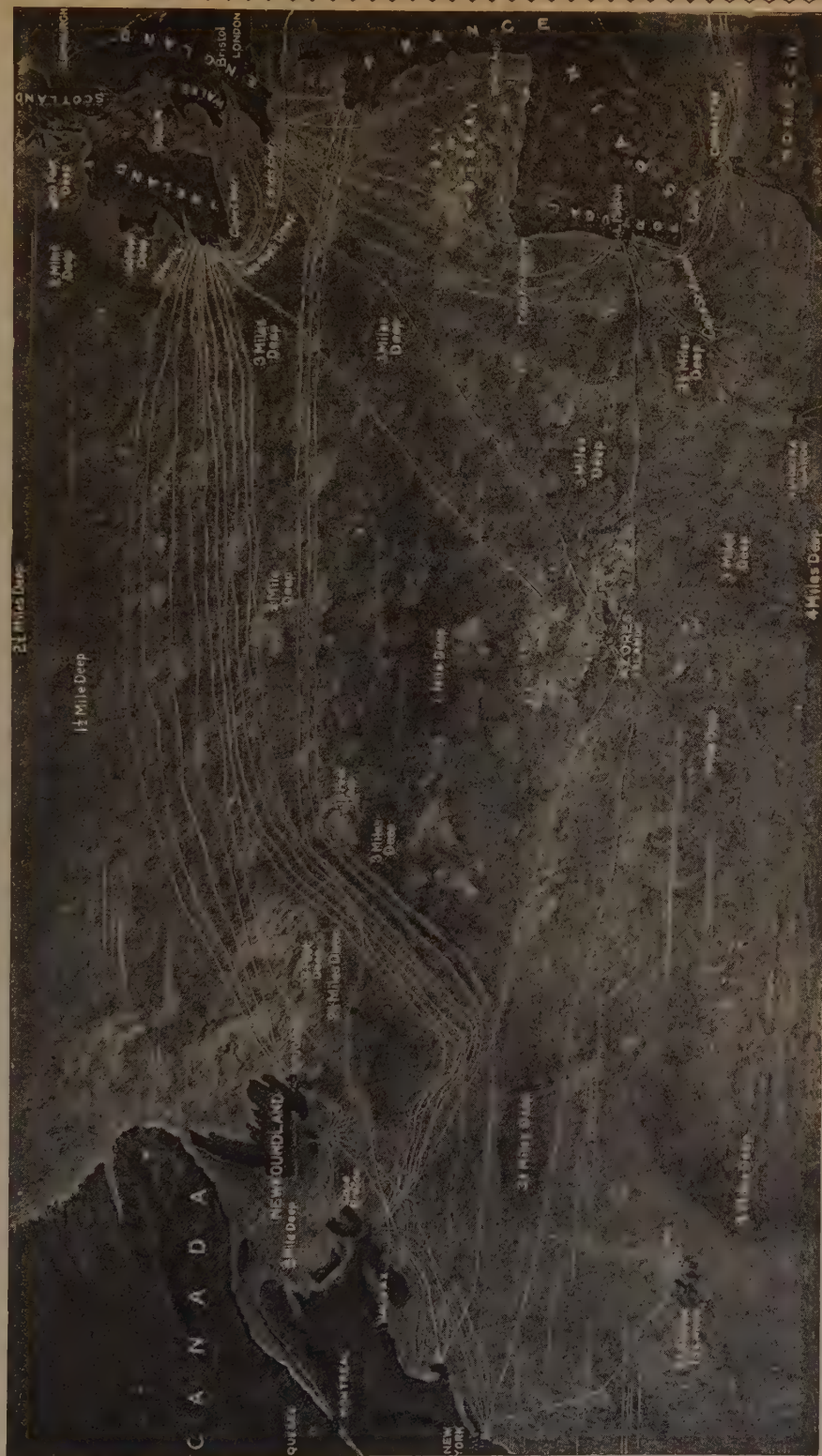
No invention, however great it is, remains where it began; ever progress is moving onward. And since the first successes of the electric telegraph a host of

and they can work up to just double that number. By the code system one word stands for a number of words or a phrase, and it has the advantage of being secret.

There are many cables across the North Atlantic now, and several different ones to the Far East. In fact, almost the entire world is now linked by cables. Of these, the All-British Cable to Australasia and the American-Pacific Cable to Japan both run into the depths of four miles.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4415.

WHAT IT IS LIKE AT THE BOTTOM OF THE ATLANTIC OCEAN



If the water in the Atlantic could be drained, the ocean bed would look like a great stretch of country with deep valleys and high mountains. These mountains would be the islands that now only peep above the waters. Stretching across the new country we should see the many cables that enable the Old World and the New to talk together.

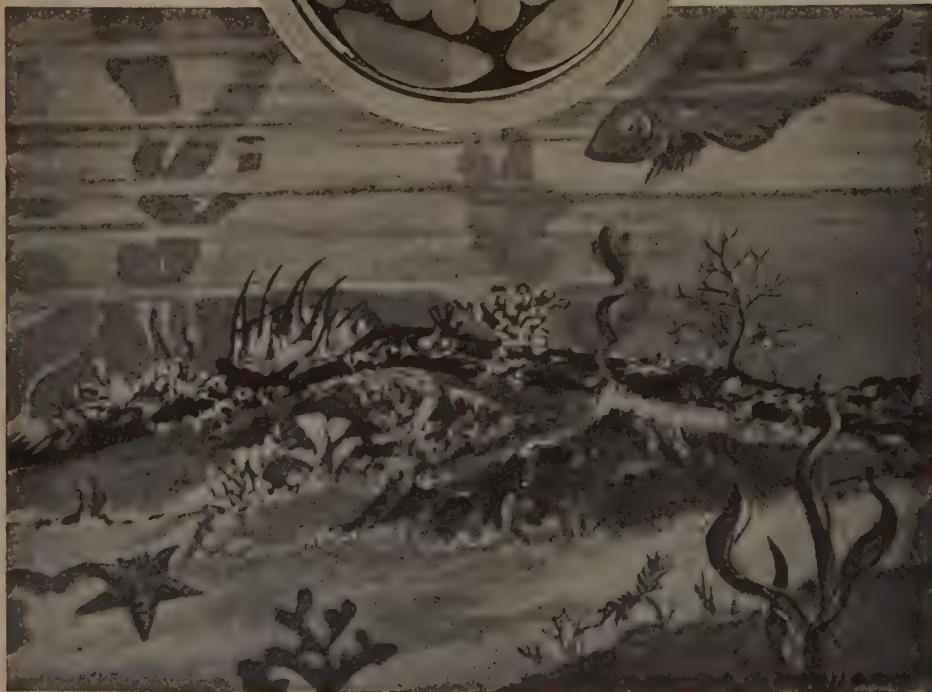
THE WIRE THAT RUNS UNDER THE SEA

One of the most wonderful things in the world is the way in which a thought can be flashed across the earth quicker than a messenger can carry a letter across a town. Every day messages are sent under the sea by means of electric cables lying along the ocean bed. These pictures show us how the cables are laid.



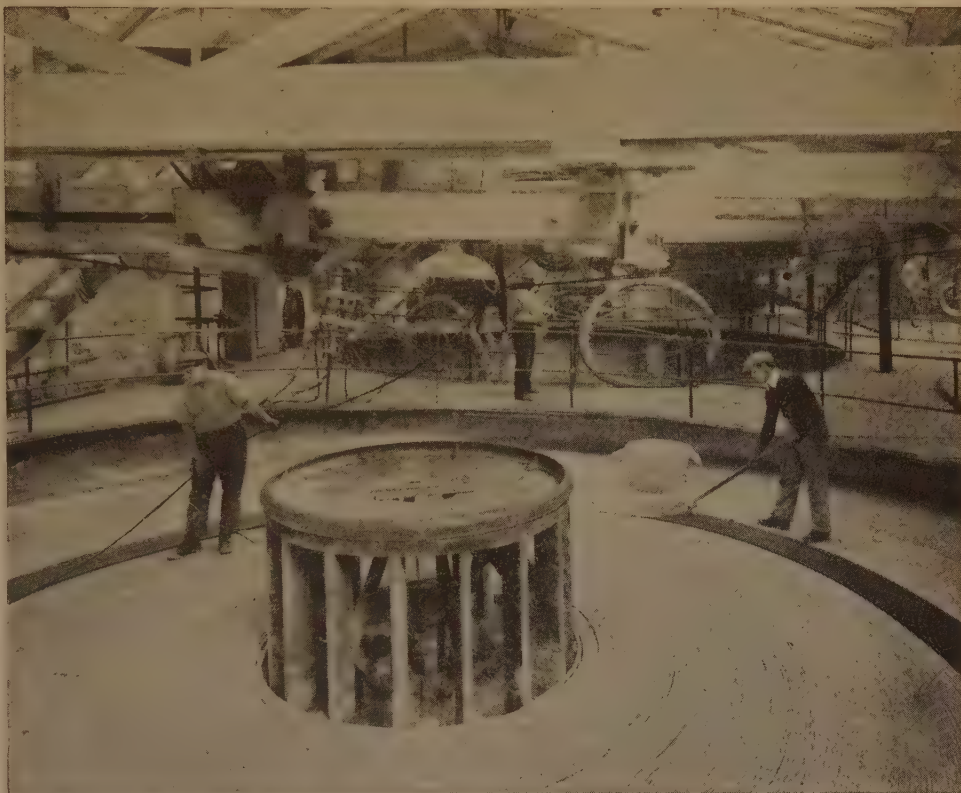
When we cable, electricity carries our message through thin wires. The wires would snap if they were not protected by coats of gutta-percha, tar, hemp, lead, or brass, and steel. A cable is thickest at its shore end to withstand great strain.

In the top picture we see a piece of cable with the different layers cut away a little to show them clearly. It is the two bundles of wires that carry the message. The picture in the circle shows a section cut across the same cable.



Marine plants and sea animals fasten and grow upon the cable at the bottom of the sea. Sometimes a cable is pulled to the surface with a large piece of coral growing all round it, or some big fish is mixed up with it. These were the greatest difficulties that the early layers of deep-sea cables had to learn how to overcome. Some years ago something went wrong with a cable near Valparaiso, in South America. When it was hauled to the surface, there was a dead whale with the cable coiled round its body. Such incidents are not uncommon.

THE SHIP THAT LAYS THE CABLE

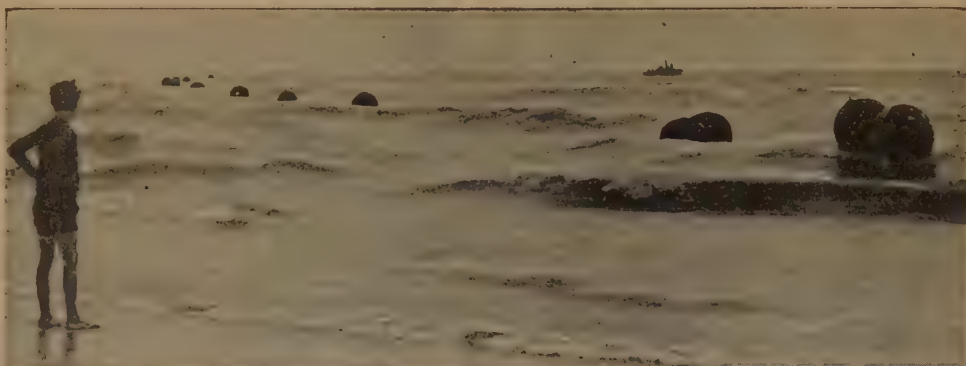


In this picture we see the cable being wound into a storage tank, which is filled with water to prevent the cable from becoming too hot or cold. The coils are whitewashed to prevent their sticking together.



Here we see a ship taking a cable on board. The ship carries machinery in the middle of the deck for winding the cable out of the tanks and paying it out into the sea as it moves along.

THE TWO ENDS OF THE OCEAN CABLE



After fixing the cable ashore the ship streams away, leaving behind it a long string of buoys to carry the line out to sea. The shore end is attached to a line of buoys and taken out to the steamer by a boat.



As the cable is laid, the buoys are taken up, and here we see a man preparing one for removal.



At the other side of the ocean the cable is landed. Here it is being supported by a line of barrels.



The end of the cable must now be fixed in the cable station, as at the beginning of the laying operations. Here the cable is being carried inland before being buried in a trench.



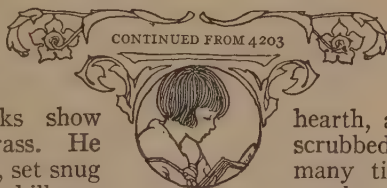
OLAF OF ORCHARD FARM

OLAF was a little boy who lived on a farm in the North Country, where the gray rocks show through the green grass. He lived in Orchard Farm, set snug in a nook between two hills, so that the west wind with the rain, and the east wind with the cold, could never have their way with it. But the kindly sun mellowed its roof, and shone on the lattice-panes in the window till they glittered like diamonds.

The farm took its name from the orchard behind the house, where apples and damsons ripened red and green and purple, among the bracken and the heather. Olaf used to play in the orchard when he was a very little boy, and later, when he was a big boy.

He used to play under the apple trees, thinking of the tales his father told him, and particularly of the brownie that had once lived at Orchard Farm, and had gone away because his father had given it a little pair of green breeches and a brown coat for saving his wife so much of the housework.

For the farmer and his wife had been on the farm for fifteen years and more, and often, as they looked round their farm kitchen and saw the brass kettle shining so brightly over the mantelpiece, and the warming-pans glittering on the walls, and the hams hanging up



CONTINUED FROM 4203

among the beams, and the black kettle that was used every day singing on the hearth, and the floor that was scrubbed I don't know how many times a week, and the wooden table that was scrubbed even cleaner, they would remember ever so long before—before Olaf was born—how there had been little need to work on these things, because while the farmer's wife was sleeping in bed, a little live thing would come night after night, and clean the floor and scrub the table, and put a shine on the kettle, and make the warming-pans so bright.

They remembered those times, and they sighed to think that the little live thing had left them. They had learned to love the little thing, though they had never seen its tiny form, and even now they missed it, and were sad that it had gone away.

Olaf used to spend his days picking up the windfall apples in the orchard, or watching the sheep grazing on the short grass. Sometimes he would help his mother with the churning, or watch the saucepan to see that the porridge did not boil over. But whatever he did during the day he was always ready to meet his father, and the big farmer used to come into the kitchen carrying Olaf on his shoulder, and saying, "A



story, my son—a story? Shall I tell you about our own brownie?”

And Olaf would climb down and run and fetch his father’s slippers. And his father would sit down heavily in the big chair, and take Olaf up, and talk of the little live thing that used to wash the dishes and keep the whole farm as clean as a new pin.

“And tell me why he went away,” Olaf said one evening.

“Well, my son,” the farmer said, “there’s great pride in brownies. They’ll work their fingers off for love, as you may say, but you mustn’t thank them. Not that you mayn’t put them a saucer of good milk, with the cream in, outside the door of a night. Many’s the night I’ve seen your mother take the saucer, and lift the latch and slip out to leave it for our brownie. But that’s all gone now. You may give them milk, and they’ll take it friendly as it’s meant. But if you pay them, they’ll take what you give them, and never come again, unless——”

The farmer’s wife interrupted.

“Don’t tell the child the way to get the brownie back, or he’ll think of nothing else, and go traveling over the wide world by night, and maybe never find his way back to us.”

“No, lass, I won’t tell him. Well, my son, you must give him nothing, or you will lose him. And I, fool that I was, I was so grateful to the little thing for all he had done for us that I thought to

myself, ‘I’ll not let him work for nothing. That little one must have fairly worn his coat out slaving for us, and as for his trousers, who knows what a state they’re in with him running to and fro?’ So I brought back a piece of fine green cloth and a piece of brown, and your mother there sat up all night a-cutting and a-stitching, and in the morning the things were done, as neat a little pair of breeches and as handsome a coat as ever she made for you.”

“It’s all true, dearie,” said the farmer’s wife.

“That night, when your mother put the milk out, she laid the clothes beside it in a little parcel, and in the middle of the night we heard the little thing talking to itself. ‘A nice pair of breeches,’ it says, ‘and a coat to my back! I can come here no more, no more, till a son of the house travels the world with me and finds me first.’”

“There, now you’ve told him,” said the farmer’s wife.

“He’ll learn some day, whether I’ve told him or no,” said the farmer.

When he had once heard about the brownie who had lived on the very farm where he was born, Olaf wanted to hear of him again and again, so that in the end the farmer and his wife used to end all their tales with a little bit about the brownie of Orchard Farm. Olaf felt it to be a great pity that the brownie should have left his home before he himself came





to live there. Some night, perhaps, he, too, might have listened to its busy, pattering feet.

He thought of the brownie all day, and felt that although the world away from the moorland might be very terrible, he was quite willing to travel in it, if only by doing so he could bring the brownie to the house again.

Olaf asked everyone he knew if they could tell him where to find the brownie. He asked the oldest apple tree in the orchard—the one with the twisted trunk, but the tree said nothing. He asked the cows, but they said nothing. He asked the dog, and it barked about other things. Only the sheep helped him. When they had been cropping near low bushes and their wool was full of little rough brambles Olaf thought they seemed to *want* to tell him something. They said nothing, but they looked as if they knew. He tended the sheep throughout the year, and watched the young lambs grow into big sheep, and watched the old sheep lying in warm places in the spring sunshine while the new lambs played about them. He wondered if the lambs had been told where the brownie was hidden, and he half thought he might be lucky enough to overhear the old sheep telling them about it.

The farmer and his wife saw that Olaf was happy to be with the sheep, so they sent him every day to see that the flock did not stray too far away over the moor-

land. All through the summer days Olaf used to lie among the heather, saying to himself, "Travels the world, and finds me first—travels the world, and finds me first."

At last, one June evening, as he was coming home from the sheepfolds, he heard the music of bagpipes, small and very faint, near him on the moorland.

He heard it again the next night, and the night after that, and every night, until at last, one midsummer evening, he made up his mind to follow it and find out who it was that played the pipes so sweetly.

He left the path and followed the music, walking warily lest he should lose it. It sounded soft and faint, and always from before him, as if it came from the pile of rocks on the moor where there is a cairn, and where a little mountain-ash waves in the breezes.

"Maybe it is the old people who live under the cairn," thought Olaf, for there is a tale in the countryside that a race of little people were buried beneath the pile of stones, and that they come out to dance on summer nights in the moonlight, though no one has ever seen them.

As he came near the little precipice he knew that the music was directly above it. So he started to climb up. Half-way was easy enough, and he won his way up to the mountain-ash. He twisted





himself over it, and rested there, wondering how to get higher, for he saw six feet of smooth rock up to the top, where there was a thick mass of heather.

There was a crack in the rock about halfway between the ash and the heather, and Olaf clung there, unable to climb farther, and knowing that if he slipped he would fall toppling to the bottom. And all the time the music of the bagpipes, scarcely louder than a concert of bees and crickets, sang close above his head.

"Oho, there—you with the music!" Olaf shouted at last.

The music stopped suddenly. A little brown face with a small white beard looked eagerly through.

"So it's Olaf at last!" it said.

A thin, brown, hairy little arm stretched down through the heather and caught Olaf by the wrist.

"Pull now," said the little thing.

And Olaf pulled, and the muscles jumped out on the hairy little arm, and Olaf found himself scrambling over the heather at the top.

He lay sprawling on the edge of a little cleft in the rock, with high walls on the sides and, far away in the midsummer night, the shapes of the hills covered with pine woods that slope to the edge of the sea. In one of the walls of rock there was a little cave, and just in front of it was a wee three-legged stool that had been upset, and a little set of bagpipes on the ground beside it. "I've been waiting for you a long time," said the little brown thing, as he helped Olaf to his feet. "Look!" And he ran into the cave, and came out dragging a broom behind him, and holding a stone so polished that even in the dim light Olaf could see his face in it. "I've worn out two hundred and thirty of these brooms," he said; "and polished that rough stone smooth—all for want of proper work since I had to leave the farm."

"Are you the brownie?" asked Olaf joyfully. "Why, I've been looking for you ever since I can remember! I should never have found you but for the sheep. I stayed with them and learned the moor music, the hum of the bees and the chirping of the crickets. When you played your pipes I knew it was different, and so I followed. That was why the sheep knew, I suppose—because you live out here on the moor?"

"Yes," said the brownie, "I've very often taken the heather from their wool for them when it was all matted and so uncomfortable. They know me quite well."



"Will you come back to the farm now?" asked Olaf.

"Not yet," said the brownie. "We must travel the world together; and then—why, then I'll give those warming-pans a shine. It's a terribly long time since I was at them. Your father should have known better than to pay a brownie. He should have known that we work for love, and here I have been all these long years polishing a stone, and wearing out brooms on the rock, waiting for the child of the house to grow up and to find me. And you've come," said the brownie, dancing into the cave, to fetch a little wooden cage with a big cockchafer inside. He opened the cage and took the cockchafer on his finger.

"You've found me," said the brownie—"you've found me; and now there's nothing left but the travels. For I'm to do a deal for you, and you for me, before I can work in Orchard Farm. Fly, cockchafer," he cried; "fly fast and straight, and tell my brothers in the pine wood by the sea. Tell them to launch the boat. Tell them we are coming—Olaf of Orchard Farm and I."

He let the cockchafer fly from his hand, and it boomed away in the still air of the summer night. An owl was calling in the valley. And Olaf heard the "krrrrrrrr" of a nightjar in the pine woods. It might, he thought, be the brownies hammering on the boat.

And that is how Olaf of Orchard Farm found the brownie, and came to make his travels with him. And if I did not hear your mother coming to blow out the candles and tuck you into bed, you should hear to-night of how they sailed to the Glittering Harbor, where the Sultan's ships lay close together in the golden sunset, and how they won a wonderful horse, and how they found the white flower that can be bought only for love, like the brownie's services.

But that is why in Orchard Farm, although Olaf's father and mother are bent and old, and sit in the chimney-corners, the kitchen floor is wonderfully scrubbed, and the pans shine brighter than those in any other kitchen of the countryside. And that is why Olaf, though he manages the farm now and has married a king's daughter, goes always with her in the evenings to lay a saucer of milk beside the door.

"We can give him that, at least," says Olaf—"and as much love as we can spare him."

And the brownie scrubs the pans and polishes them till they shine, and washes the dishes, and is very, very happy to know that he will never be paid in money for it.

THE NEXT STORIES ARE ON PAGE 4431.



THE OLD AND THE NEW HARVARD



This picture, made from an old engraving, gives a view of Harvard College as it appeared about the year 1830, and may be compared with the view below, which shows only a corner of the Yard. The buildings were few, the faculty was small, and only a few hundred students were in attendance.



© Ewing Galloway.

Harvard College has long since grown into Harvard University. The old buildings have been replaced by larger and finer structures, and dozens of new ones have been built. This is a view across the Yard, with University Hall, the administration building, on the right. Beyond are dormitories.



The Woman's Building of the University of Illinois.

AMERICAN COLLEGES AND UNIVERSITIES

IN the United States there are many schools for higher education called colleges or universities. Some lists have nearly a thousand—more than in any other country in the world. In Europe the words are used very carefully, and the schools themselves are under strict laws. In the United States the national government does not control education, which is left to the states.

Some of the states have strict laws, and some have almost none. Some will not allow a school to call itself a college unless it has proper buildings and money enough to pay a certain number of professors. Others allow any school to call itself a college or university. Some of the colleges and universities are as good as are to be found anywhere in the world, while others are not so good as some high schools.

THE DIFFERENCE BETWEEN A COLLEGE AND A UNIVERSITY

It is hard to say exactly what is the difference between a college and a university in the United States, as the words are used very carelessly. This understanding is growing common, however. A college is a school which takes boys or girls, or both, after they



have finished an academy or high school. They attend at least three years, generally four, and if they have passed examinations in the subjects studied, they get a degree such as Bachelor of Arts or Bachelor of Science. This gives them the right to place A.B. or B.S. after their names, and means that they have taken the first step in learning. Such a college may be a part of a university, or may be independent.

A university is a collection of several schools or colleges. Besides the college for general education, there are often special schools for such subjects as theology, law, medicine, dentistry, engineering, mining, agriculture, education, journalism, business and the like. Not every university will have all of these, but it must have some of them. Besides, it should have a school to train graduates of the colleges still further. When you see such letters as A.M. or M.S. after the name of a man or woman, it means that he or she has gone through a college and has spent at least one year in further study. When you see Ph.D. or D.Sc. after a name it means that he or she has spent several years after graduation from col-

lege in studying a very few subjects, giving most of the time to one. This is what is meant by having a doctor's degree in mathematics, for example. The person who has this spent most of his time studying mathematics, but probably studied physics also, and perhaps another subject or two.

HOW SOME OF THE GREAT UNIVERSITIES BEGAN

Some of the great universities in the United States began as small colleges and grew into universities as they increased in attendance and wealth. This is true of Harvard, Yale, Princeton, Columbia and others. On the other hand, the men in charge of some colleges have not wished them to grow into universities, but have preferred to have them do college work well. These colleges give only a bachelor's degree, but the work done in such institutions as Williams, Amherst, and others is quite as good as that done in any college which is a part of a great university. Counting together the colleges belonging to universities and the independent colleges, there are about one hundred and fifty of high rank in the United States. The others have not a high standard.

Some of the universities, which have been established later, had several schools when they opened. This is especially true of the institutions in the West, which were founded by the state, and of some of the new universities to which wealthy men have made great gifts. As we said before, there are others which have no right to the name university at all. Wealthy men have also made large gifts to colleges and universities already established. Many of the institutions established as church colleges are now independent, but churches still support and control many colleges and universities.

HARVARD, THE FIRST COLLEGE ESTABLISHED IN THE COLONIES

The first college founded in what is now the United States was Harvard, which was begun in 1636, only a few years after the first settlers came to Massachusetts. It was named for a young minister, John Harvard, who left the college his library and £400 when he died. It was little more than an academy at first, and the boys were publicly whipped if they broke the rules. Now it has thousands of students, scores of buildings and hundreds of teachers.

The next college opened in the colonies was William and Mary College at Williamsburg, Virginia, founded in 1693. It was prosperous down to the Revolution, but until lately has not grown as some other colleges have done. Many distinguished men studied here. We can mention Presidents Jefferson, Monroe and Tyler, Chief Justice Marshall, and General Winfield Scott.

Yale began as a school for the training of ministers in 1701, and at first was located wherever the president lived. In 1716 it was decided to move the school to New Haven, and from small beginnings it has become famous. It was named for a Welshman, Elihu Yale, who made the first important gift to the school. Princeton was founded at Elizabeth (then called Elizabethtown), New Jersey, in 1746, but was soon removed to Newark. In 1756 the college was removed to Princeton, where it has remained ever since. Though called Princeton soon after it was moved to that town, the real name was the College of New Jersey at Princeton, until 1896, when it became Princeton University. President Wilson was student, professor and president at Princeton.

NINE COLLEGES WERE FOUNDED BEFORE THE REVOLUTION

Nine colleges, which still exist in what is now the United States, were founded before the Revolution, and before 1800 there were twenty-one. Some of these were King's College (now Columbia) at New York in 1754; Queen's (now Rutgers) at New Brunswick, New Jersey, in 1766; Rhode Island College (now Brown University) at Providence in 1764. Dartmouth began as a school for Indians, in Connecticut, but was moved to Hanover, New Hampshire, in 1769. Though called a college, this school now has some of the departments of a university. Bowdoin and Williams were also founded before 1800.

Nearly all of these colleges were founded by different churches, but now we come to those of a different kind. What we now call the University of Pennsylvania was founded as a charity school in 1740, and through the help of Benjamin Franklin was much improved. It was soon called the College and Academy of Philadelphia, and in 1791 received its present name. The University of North Carolina at Chapel Hill was given a charter in 1789 and was opened

YALE AND COLUMBIA



Yale University began as a school in 1701, and classes were taught in different places. A lot was bought at New Haven in 1716, and the institution was called Yale College, in honor of Elihu Yale, who made liberal gifts. The college grew slowly at first, but for a long time has been one of the leading institutions in the country. Phelps Hall, through which is an entrance to the quadrangle, is one of the many buildings.



Columbia University grew out of Kings College, founded in 1754, and is now the largest university in the United States. The centre building is the Library. Some of the many schools are situated in other parts of the city.

Photo, Ewing Galloway.

for students in 1795. These are the oldest of the state universities. Though the University of North Carolina was the first institution to be called a university, Pennsylvania was already open for students.

MANY STATES ESTABLISH UNIVERSITIES AT PUBLIC EXPENSE

In the years that followed, nearly every southern and western state established a state university. As new states were admitted to the Union, Congress set aside great tracts of land to support a university in each state. Some of the states sold the land for very little, but others held on to it until it became very valuable. All the people of these states pay taxes for the support of the universities also, and some of the universities have very large incomes.

We cannot name all the state universities. There are now about forty of them, and so it would be easier to name the states that do not have them. Massachusetts, Rhode Island, Connecticut, New York and New Jersey have no state universities. The University of Pennsylvania is partly supported by the state. There is a University of Porto Rico, of the Philippines, and of Hawaii. We show you pictures of some of the state universities, but we do not mean that these are better than the others. Many we have not named are quite as good. The same is true of the other institutions we show.

MANY SUBJECTS TAUGHT IN THE STATE UNIVERSITIES

These universities teach many subjects to their students, and many of them have summer schools where teachers and others come to study for a few weeks. Some have short courses in agriculture to which farmers come to learn better methods of caring for their cattle and other live stock, or to learn new things about planting and cultivating their crops. These universities will teach any subject which will be of benefit to the people of their states. Many of them have several thousand students, and have gained high reputations for the quality of their work.

Several of the larger cities support colleges or universities. The City of New York has a college for men and another for women. Charleston, South Carolina, and Cincinnati, Toledo and Akron, in Ohio, also have colleges or universities supported by city taxes. Several other

cities in different parts of the country are discussing the question of founding city colleges so that their boys and girls may go beyond the high schools at home.

We have mentioned the colleges and universities founded by churches and those by the states and cities. Now there is another kind, founded by wealthy men who wished to do good with their money. The largest and most important of these are Johns Hopkins University, at Baltimore, Stanford University, at Palo Alto, California, and the University of Chicago. There are many others. Cornell University, at Ithaca, New York, was founded partly by an individual and partly by the state. It has received many large gifts.

GIRLS MAY NOW GET A COLLEGE EDUCATION

Not many years ago there was little chance for a girl to get higher education. She was not admitted to the colleges with her brothers, and the schools for girls were not very good. All that is changed now. More than half of the colleges admit both women and men, and there are some colleges for women quite as good as the colleges for men only. The largest and best known of these are Vassar, Wellesley, Smith, Bryn Mawr and Mount Holyoke. A special college for women is a part of several universities, as Radcliffe at Harvard, and Barnard at Columbia. There are several other colleges for women which have high standards. So to-day a woman can get an education almost as easily as a man. The girls at these colleges enjoy themselves quite as much as their brothers do at their colleges, if not more.

COLLEGES OF OTHER KINDS OF WHICH WE CANNOT SPEAK

We cannot stop to tell you of another kind of college to teach agriculture and mechanics, which is found in every state. The United States Government has helped to found these. In some states such a college is a part of the university; in others it is separate. We have not time to tell of the schools which teach science and engineering. Enough has been told to show you that the United States certainly has colleges enough—perhaps more than can be supported properly, for it takes a great deal of money to support a college. When fees are charged they are never large enough to pay more than a small part of the expenses. Either taxes or other income must furnish the remainder.

PRINCETON AND CORNELL



Holder Hall, one of the newer dormitories at Princeton University. The institution was founded at Elizabeth in 1746, and moved to Princeton in 1756. The official name was the College of New Jersey until 1896. Sage Tower is seen at the left.

Photo, Press Illustrating Service.



Photo, Ewing Galloway.

Cornell University, at Ithaca, New York, founded in 1865 by a large gift from Ezra Cornell, also receives appropriations from the state. The site on Cayuga Lake is one of rare beauty. The Library shown above is the centre of the activities of the university and contains an unusual collection of books.

NEW ENGLAND AND NEW YORK



Photo, Publishers Photo Service.

Brown University, in Providence, Rhode Island, grew out of Rhode Island College, a Baptist institution chartered in 1764. It is a prosperous institution with a large faculty and many buildings. This is a night view of the John Hay Library, which is a modern building and well equipped.



Photo, Ewing Galloway.

This is the Hudson Gate of the College of the City of New York. This college is supported by the City of New York, and is free to any New York boy who is prepared to enter. There is also a school of education, a school of business, an engineering school, a night college, a summer school, and many special courses are open to the employees of the City. Many courses are open to women.

FOUR COLLEGES FOR WOMEN



Photo, Margaret de M. Brown.
Thompson Memorial Library at Vassar.



Rockefeller Hall at Bryn Mawr.



Emerson House, one of the newer dormitories at Smith.



Founders' Hall at Wellesley is shown above. These four colleges for women, and others not illustrated, offer to girls opportunities for securing education equal in every respect to that open to their brothers.

Photo, The Maynard Workshop, Waban, Mass.

ARIZONA, VIRGINIA AND MARYLAND



Photo, Publishers Photo Service.

The Agricultural Building of the University of Arizona at Tucson.



Photo by Burton Holmes, from Ewing Galloway.

The University of Virginia, near Charlottesville, was founded by Thomas Jefferson, who planned not only the buildings but the organization of the institution. The centre building is the library.



Johns Hopkins University was founded by a wealthy merchant of Baltimore, and soon became one of the leading institutions in the country. This is the new Civil Engineering Building in a suburb of the city.

Photo, Ewing Galloway.

THREE GREAT MID-WESTERN INSTITUTIONS



Photo, Ewing Galloway.
Bascom Hall, University of Wisconsin.



Photo, F. W. Kent.
A glimpse of the University of Iowa.



This is Hill Auditorium at the University of Michigan. The three state universities shown upon this page count their buildings by the dozen and their students by the thousand. Their influence upon the life of their states and sections is enormous.

Photo, Ewing Galloway.

TWO IMPORTANT CATHOLIC INSTITUTIONS



Georgetown University, in Washington, D. C., was founded in 1789, and is now under the direction of the Society of Jesus. Besides the college and the graduate school, several professional schools belong to the university. The astronomical observatory was founded in 1842. The present building is shown above.

Photo, Ewing Galloway.



The University of Notre Dame, at Notre Dame, Indiana, was founded in 1842, by the Congregation of the Holy Cross, a Catholic teaching order. It includes not only a college but several professional schools, and preparatory schools as well. The Administration Building is one of many buildings.

TWO UNIVERSITIES OF THE FAR WEST



The University of Washington was founded before the state was admitted to the Union, and is now one of the leading state universities. This picture shows a part of the immense campus inside the city of Seattle. The University has many different schools, and was one of the first institutions to teach journalism.

© L. A. Linkletter, Seattle.



One of the most unusual buildings, if it is a building, at the University of California is the Greek Theatre, used for plays and meetings. The theatre is like those of ancient Greece, in which the plays of the great Greek writers were given. The university is situated at Berkeley, and has a fine view of San Francisco and the Golden Gate. It has thousands of students in its many schools.

GLIMPSES OF A CALIFORNIA UNIVERSITY



The buildings of Stanford University, at Palo Alto, California, follow the Spanish mission style of architecture. All of the many buildings are connected by arcades of stone.



The university was founded by the parents of the young man whose name it bears. The Memorial Church is one of the most lavishly decorated buildings in the United States.



Senator Stanford gave his Palo Alto estate of 9,000 acres as a site for the university, and a large tract has been reserved as a setting for the buildings. The many low buildings connected by arcades of stone, are arranged in two quadrangles, one inside the other. They form a pleasing architectural group, and the beauty is increased by luxuriant vegetation.

A STIRRING TALE BY JANE PORTER

TWO hundred years before the Americas were discovered, the energies of the peoples in the Old World were turned to fighting among themselves. Between Scotland and England there was constant warfare. In her book *Scottish Chiefs*, written in 1810, Jane Porter has given a very vivid picture of the struggle. The romantic Sir William Wallace was the hero. Immediately it was published her book was accepted by all Scots as a tribute to the cherished memory of Wallace. Not only to those of Scottish blood did *Scottish Chiefs* appeal: it became a favorite with every English-speaking hero-worshiping boy and girl. It is a book everyone should read for its lesson in courage and chivalry. Apart from its historical interest it is a splendid story.

THE SCOTTISH CHIEFS

IN the year 1296 Scotland was in a bad plight. Edward I of England had entered the country at the head of a large army and had laid the land in ashes. John Baliol, king of Scotland but a very weak man, had acknowledged Edward as his liege lord. Some of the nobles had followed their king's example. But there were many who did not.

Sir William Wallace, then a man of twenty-six years, was one of those who would not submit to the English claim of dominion over Scotland. With his bride, the beautiful and beloved Lady Marion, he retired to the tower of Elderslie. Elderslie became a refuge of the friendless and a comfort to the unhappy. There came men who were too noble to bend the knee to a foreign overlord. There they dreamed and planned of the day when Scotland should be free again, with the tyrant driven over the border.

One afternoon a stranger chieftain arrived at the gate and asked to speak to Sir William privately. Immediately after speaking to this man Sir William told his bride that the stranger was Sir John Monteith, who besought him to return with him to Douglass Castle near Lanerk (Lanark) on some very pressing business. There Monteith gave into his charge a casket which Baliol



had intrusted to Lord Douglas. Monteith had carried the box to

Douglass Castle, where it had been hidden. Douglas had been taken prisoner by the English, but he had sent a message instructing Monteith to commit the box to the worthiest Scot he knew. In addition, Douglas gave the solemn warning that "it will be at the peril of his soul who dares open it till Scotland be again free."

As Wallace was returning through Lanerk he went to the rescue of two Scots who were being attacked by English soldiers. In the fighting Arthur Heselrigge, the nephew of the English governor of Lanerk, was slain. The two Scots were conveyed to Elderslie, where Wallace found that he had saved the life of Donald, Earl of Mar. Hard on his heels came a party of soldiers sent by Governor Heselrigge to capture Sir William. Lord Mar was secreted in a dried-out well and the sacred box was lowered with him. Wallace himself took refuge in a tree. Gilbert Hambleton, the officer in charge of the search party, searched the tower and, after some courteous words to Lady Marion, withdrew his men.

There was no doubt that another party would be sent to Elderslie, so Wallace escaped to the hills. Hesel-

rigge himself, in a furious rage, headed the second band that came to the tower. He tried to terrify Lady Marion into telling of the hiding-place of her lord. As he drew his sword the gentle lady sank to her knees. "I kneel to Heaven alone! and may it preserve my Wallace from the fangs of Edward and his tyrants!" The brutal Englishman plunged his sword into her breast as Halbert, her faithful servant, sprang forward to protect her. Grimsby, an English soldier, refused to follow Heselrigge after that dastardly deed. He assisted Halbert to get the Earl of Mar from the well.

Halbert, the old servant and minstrel, made his way painfully to Wallace and told him the sad news. The old man had brought with him Heselrigge's sword which had murdered Lady Marion. Wallace was frantic with grief and rage. Sounding the pibroch of Lanerkshire, he summoned the men of the mountains. They were horrified at his tidings, and volunteered to a man to avenge Lady Marion. Led by Sir William, the faithful band swept into Lanerk and stormed the castle. Wallace himself plunged the fatal sword into Heselrigge's heart.

From that moment the English declared the Scottish chief to be an outlaw. Wallace sent Halbert to the Earl of Mar with a lock of his hair and a message that his life was consecrated to the freeing of Scotland. Lady Helen Mar, who was present when the messenger arrived, wove the hair into the Mar banner and underneath embroidered Wallace's words: "God armeth me." Her cousin, Lord Andrew Murray (or Moray, as it is sometimes spelled), asked to be custodian of the banner and announced his intention of gathering all his men and joining Wallace. But first, at Helen's request, he set out for Elderslie and brought back the body of the Lady Marion. Lady Mar, Helen's stepmother, did all she could to discourage the Earl, her husband, from aiding Sir William, but the old Scot stood firm. That night, however, Bothwell Castle was attacked by the English. The Earl and Lady Mar were taken prisoners. But Lord Andrew rescued Helen and took her for safety to the priory of St. Fillan. With the prior he also left the box intrusted to Wallace. Lord Andrew then hastened to his uncle, Sir John Moray, recruited thirty men, and set off to join Wallace.

Through treachery on the part of Lady Mar, Helen was taken from St. Fillan by an evil Englishman—Lord Soulis—whom she had refused to marry. But a Scottish knight whom she did not know rescued her. Soon she was able to take refuge with her aunt, Lady Ruthven.

Meanwhile chiefs and lords from all parts of the country were flocking to Wallace's banner. Among them was a youth who desired only to be known by one name—Edwin—until he had won his spurs. That he did nobly when Wallace stormed Dumbarton Castle and rescued the Mars. Edwin proved to be the nephew of the Earl of Mar, Edwin Ruthven. Henceforth he was Sir William's dearest friend. After escorting the Earl of Mar and his family to Rothsay Castle in Bute, the Scottish chief was summoned in haste to Ayr, where his grandfather, Sir Ronald Crawford, and eighteen other noblemen had been put to death by the English. A swift revenge was taken, and the barracks, or barns, as they were called, were burned to the ground. Lord Ruthven, Edwin's father, was among the rescued.

The taking of the stronghold Berwick Castle was Wallace's next success. That brought still more Scots to his army. Greatly were the reinforcements needed, for Helen Mar sent him word that her father and stepmother were prisoners again. She asked his help, for the governor at Scone had condemned the Earl to death. Her plea was answered at once. Not only did Wallace rescue the Mars again, but he defeated an army of 60,000 Southrons, as the English were called by the Scots.

Always this gallant Scottish leader was the soul of knighthood and mercy. Where his supporters would have killed many of the prisoners he granted them their lives. Gentleness and strength made Wallace a great man.

Lady Helen Mar was to meet Wallace for the first time, as she thought, after the taking of Scone. But, to her amazement, she found the renowned chief to be the knight who had rescued her from Lord Soulis. Her emotion was so great that she fainted as he came into the room. Instantly Lady Mar, her stepmother, became jealous, for, although the wife of the Earl, she had fallen in love with Wallace. From that moment she took pains to keep Helen and Wallace apart.

But by accident Helen was in the chapel praying when Wallace entered. Someone crept in and tried to stab the Scottish knight, but Helen saved him, although the dagger pierced her arm. The would-be murderer proved to be the Englishman Lord De Valence. To him Wallace returned the dagger with a warning to him to use his weapon in more honorable causes.

In his generosity Wallace had demanded from the English an interchange of prisoners. Among the Scottish lords that were released were several who were extremely jealous of the success of their deliverer. From the time they were freed they began to plot the overthrow of the man who was saving their country. The Earls of Athol, Buchan and March were the traitors. When Wallace defeated King Edward himself, Wallace was made regent of Scotland. This infuriated the treacherous nobles. They demanded that Wallace resign in favor of the rightful king, and secretly began to send messages to the English. Lady Helen Mar got wind of this and courageously brought the warning to the Earl of Mar, who summoned Wallace.

In the next battle Lords Athol and Buchan deserted to the English. But what cut Wallace to the heart was the sight of the banner of the Bruce floating in the English ranks. But joy came to his heart when young Robert Bruce appeared and announced his intention of joining with the Scots. The English were defeated and withdrew. But Lord Mar was wounded unto death. His last request to Sir William Wallace was to rescue Helen, who had been kidnaped

by the vile English lord De Valence. Wallace gave his promise.

Hoping that his resignation would stop the quarrels among the nobles, Wallace gave up the regency. Secretly, in the dress of a minstrel, he left Scotland and entered the court of King Edward himself. There he hoped to find some trace of Lady Helen Mar. He found that Helen had been taken to France by De Valence. But in the castle, a prisoner, was young Robert Bruce, who, since his father had just died, was the heir to the Scottish throne. After a narrow escape from the English court Wallace reached France, where he was soon joined by Robert Bruce. They found the place where Helen was held a prisoner, and by the aid of Grimsby they rescued her and brought her safely to Scotland again. Wallace joined his soldiers at once.

Bruce did not reveal his name, but fought gallantly at the side of Wallace in a battle against the English. But he received a serious wound and was forced to retire to the country while it healed. In his absence Lady Mar, dressed as a soldier, came to Wallace and asked him to marry her. Wallace refused. Angered and humiliated, Lady Mar brought a charge of treachery against Sir William. Many of the nobles turned against him. When King Edward sent a messenger demanding submission, hundreds of chieftains acknowledged the English king. With Edwin as his companion, Wallace left Stirling, with the hope that Robert Bruce would accomplish what he had failed to do.

In a passage from the book we give the saddest hour in Scotland's history.

THE BETRAYAL OF WALLACE

WALLACE now told his friends that it was his design to cross the hills into Ayrshire, in some of the ports of which he did not doubt he should find some vessel bound for France. This design Edwin overturned by telling him, that in the moment the abthanes repudged their secret faith to Edward, they sent a strong guard to Ayrshire, to watch the movements of his powerful relations, and to prevent their hearing of, or marching to the assistance of, their wronged kinsman. Since then, no sooner was it discovered by the insurgent lords at Roslyn that Wallace had disappeared from

the camp, than supposing he meant to appeal to Philip, they dispatched expresses all along the western and eastern coasts, from the Firths of Forth and Clyde to those of Solway and Berwick upon Tweed, to intercept him. Wallace, on finding that all avenues from the southern part of his country were closed upon him, determined to try the north. Some bay in the western Highlands might open its yet not ungrateful arms, to set its benefactor free. "And if not by a ship," returned Edwin, "a fisher's boat shall launch us from the country which is no longer worthy of you; and, by the power

of Him who hushed the raging waves of Galilee, my master will yet find a haven and a friend."

Their course was then taken along the Cartlane craigs, at a distance from those villages and mountain cots which, leaning from their verdant heights, seemed to invite the traveler to refreshment and repose. Though the sword of Wallace had won them this quiet: though his wisdom, like the cornucopia of Ceres, had spread the lately barren hills with beautiful harvests, yet, had an ear of corn been asked in his name, it would have been denied. A price was set upon his head, and the lives of all who should succor him would be forfeited. He who had given bread and homes to thousands, was left to perish—had not where to lay his head. Edwin looked anxiously on him as at times they sped silently along. "Ah!" thought he, "this heroic endurance of evil is the true cross of our celestial captain! Let who will carry its painted insignia to the Holy Land, here is the man that bears its real substance, and walks undismayed in the path of his sacrificed Lord."

The black plumage of a common Highland bonnet, which Edwin purchased at one of the cottages whither he had gone alone to buy a few oaten cakes, hung over the face of his friend. That face no longer blazed with the fire of generous valor; it was pale and sad; but whenever he turned his eye on Edwin, the shades which seemed to envelop it disappeared; a bright smile spoke the peaceful consciousness within, and a look of grateful affection expressed his comfort at having found that in defiance of every danger, he was not yet forsaken. Edwin's happy spirit rejoiced in every glad beam that shone on the face of him he loved. It awoke felicity in his heart, for merely to be on occasions near Wallace, and to share his confidence with others, had always filled him with joy; but now to be the only one on whom his noble heart leaned for consolation, was bliss unutterable. He trod in air, and even chid his beating heart for the throbs of delight which seemed to exult when his friend suffered. "But not so," ejaculated he internally; "it is delight to live and die with thee. And if it be such pleasure even to share thy calamity, what will be my felicity when I dwell with thee in security and princely honors? For such,

dearest of friends, will be the welcome of Philip to his Lord of Gascony." These thoughts comforted Edwin, but he did not allow them to escape his bosom.

As they arrived within sight of the high towers of Bothwell Castle, Wallace stopped. "We must not go thither," said Edwin, replying to the sentiment which spoke from the eyes of his friend; "the servants of my cousin Andrew may not be as faithful as their lord." "I will not try them," returned Wallace, with a resigned smile. "My presence in Bothwell chapel shall not pluck danger on the head of my dauntless Murray. She wakes in heaven for me, whose body sleeps there; and knowing where to find the jewel, my friend, shall I linger over the casket?"

While he yet spoke, a chieftain on horseback suddenly emerged from the trees which led to the castle, and drew to their side. Edwin was wrapped in his plaid, and cautiously concealing his face, that no chance of his being recognized might betray his companion, walked on without once looking at the stranger, the first glance at whose knightly caparisoned horse had declared his quality. But Wallace, being without any shade over the noble contour of a form which, for majesty and grace, was unequaled in Scotland, was not to be mistaken. He moved swiftly forward. The horseman spurred after him. Wallace perceived himself pursued, and therefore known, and aware that he must be overtaken, suddenly stopped. Edwin in a moment drew his sword, and would have given it into the hand of his friend, but Wallace, putting it back, rapidly answered, "Leave my defense to this unweaponed arm. I would not use steel against my countrymen, but none shall take me while I have a sinew to resist."

The chieftain now checked his horse in front of Wallace, and respectfully raising his visor, discovered Sir John Monteith. At sight of him, Edwin dropped the point of his yet up-lifted sword, and Wallace stepping back, "Monteith," said he, "I am sorry for this rencounter. If you would be safe from the destiny which pursues me, you must retire immediately, and forget that we have met." "Never!" cried Monteith; "I know the ingratitude of an envious country drives the bravest of her champions from its borders; but I also know what belongs to myself! To serve you at all hazards; and in my castle

of Newark, on the Firth of Clyde, to demonstrate my sense of the dangers you once incurred for me. I therefore thank my fortune for this rencounter."

In vain Wallace urged his determination not to bring peril on even the obscurest of his countrymen, by sojourning under any roof till he was far from Scotland. In vain he pointed to Monteith the outlawry which would await him, should the infuriate abthanes discover that he had given their self-created enemy a shelter. Monteith, after as unsuccessful persuasions on his side, at last declared that he knew a vessel was now lying at Newark, in which Wallace might embark without entering any house. He ended with imploring that his friend would allow him to be his guide to its anchorage. To enforce this supplication, he threw himself off his horse, and leaving it to stray whither it would, with protestations of fidelity, that trampled on all dangers, he entreated, even with tears, and the most vehement gestures of despair, not to be refused the last comfort which he foresaw he should ever know in his now degraded country. "Once I saw Scotland's steady champion, the brave Douglas, rifled from our shores! Do not, then, doom me to a second grief, bitterer than the first; do not you yourself drive me from the side of her last hero! Ah! let me behold you, companion of my school-days, friend, leader, benefactor, till the sea wrests you for ever from my eyes!" Exhausted and affected, Wallace gave his hand to Monteith; the tear of gratitude stood in his eye. He looked affectionately from Monteith to Edwin, from Edwin to Monteith: "Wallace shall yet live in the memory of the virtuous of this land; you, my friends, prove it. I go richly forth, for the hearts of good men are my companions."

As they journeyed along the devious windings of the Clyde, and passed at a distance the aspiring turrets of Rutherglen, Edwin pointed to them, and said, "From that church, a few months ago, did you dictate a conqueror's terms to England!" "And now that very England makes me a fugitive!" returned Wallace. "Oh! not England!" interrupted Edwin, "you bow not to her. It is blind, mad Scotland, who thus thrusts her benefactor from her!" "Ah! then, my Edwin," rejoined he, "read in me the history of thousands! So various is the fate of a peo-

ple's idol; to-day he is worshiped as a God, to-morrow thrown into the fire!"

Monteith turned pale at this conversation, and quickening his steps, in silence hurried past the opening of the valley which presented the view of Rutherglen.

Night overtook the travelers at the little village of Lumloch, about two hours' journey from Glasgow. Here, as a severe storm came on, Monteith advised his friends to take shelter and rest. "As you object to lodge with man," said he, "you may sleep secure in an old ruined barn, which at present has no ostensible owner. I saw it as I passed this way from Newark. But I rather wish you would forget this too chary regard for others, and lodge with me in the neighboring cottage." Wallace was insensible to the pelting of the elements; his unsubdued spirit neither wanted rest for mind nor body; but the languid voice and lingering step of the young Edwin, who had been unused to such fatigue on foot, penetrated his heart; and notwithstanding that the resolute boy, on the first proposal of Monteith, suddenly rallied himself, and declared that he was neither weary nor faint, Wallace saw that he was both, and yielded his consent to be conducted from the storm. "But not," said he, "into the house. We will go into the barn, and there, on the dry earth, my Edwin and I will sleep."

Monteith did not oppose him further, and pushing open the door, Wallace and Edwin entered. Their friend soon after followed with a light, which he brought from the cottage, and pulling down some unheaped straw, strewed it on the ground for a bed. "Here I shall sleep like a prince," cried Edwin, throwing himself along the scattered truss. "But not," returned Monteith, "till I have disengaged you from your wet garments, and for the sake of future scenes of prowess, preserved your arms and brigandine from the rust of this night." Edwin, sunk in weariness, said little in opposition, and having suffered Monteith to take away his sword and dagger, and to unbrace his plated vest, dropped at once on the straw in a profound sleep.

Wallace, that he might not disturb his friend by the murmur of debate, also yielded to the request of Monteith, and unbuckling his cuirass, gave it to him, and laying himself down by Edwin, waved their conductor a good night. Monteith

nodded the same, and closed the door upon his victims.

Well known to the generals in Edward's army, as one whose soul was a mere counter in traffic, Aymer de Valence, on being appointed Lord Warden of Scotland, in the room of De Warenne, who was incapacitated by the wound he had received in the last battle near Dalkeith, told his king, that if he would authorize him to offer an earldom, with adequate estates, to Sir John Monteith, the old friend of Wallace, he was sure so rapacious a chieftain would traverse sea and land to put that formidable Scot into the hands of England. To incline Edward to the proffer of so large a bribe, De Valence instanced Monteith's having volunteered, while he commanded with Sir Eustace Maxwell on the borders, to betray the forces under him to the English general. The treachery was accepted, and for its execution he received a casket of uncouth gold. Some other proofs of his devotion to England were mentioned by De Valence. "You mean his devotion to money," replied the king; "and if that will make him ours at this crisis, give him overflowing coffers, but no earldom. Though I must have the head of Wallace, I would not have one of my peers show a title written in his blood. Ill deeds must sometimes be done, but we do not emblazon their perpetrators."

De Valence having received his credentials, sent Haliburton, a Scottish prisoner who bought his liberty too dear by such an embassy, to impart to Sir John Monteith the King of England's proposal. Monteith was then castellan of Newark, where he had kept close for many months, under a pretence of the reopening of old wounds; but the fact was, his treasons were connected with so many accomplices that he feared some disgraceful disclosure, and therefore kept out of the way of exciting any public attention. Avarice was his master passion, and his suspicions that there was treasure in the iron box which he had, unwitting of such a circumstance consigned to Wallace, first showed to him his idolatry of gold. His murmurs for having allowed the box to leave his possession, gave the alarm which caused the disasters at Elderslie and his own immediate imprisonment. The lieutenant at Lanerk, after the death of Heselrigge, sent Monteith, then his prisoner, towards Stirling, for Cressing-

ham to punish according to his pleasure. Sir John made his escape from the party that conveyed him, but in flying through a wood, fell into Soulis's hands. That inhuman chieftain threatened to return him immediately to his dungeons, and to avoid such a misfortune, Monteith engaged in the conspiracy to bring Lady Helen from the priory to the arms of this monster. On her escape, the infuriate Soulis would have wreaked his vengeance on his vile coadjutor by surrendering him to his enemies, but Monteith, aware of his design, fled, and ran even into the danger he would have avoided. He fell in with a roaming party of Southrons, who conveyed him to Ayr. His short sojourn with Soulis had plunged his soul deep in guilt. He had once immolated his honor, and he now kept no terms with conscience. Arnulf soon understood what manner of man was in his custody, and by sharing with him the pleasures of his table, and giving him certain divisions of the plunder that was daily brought in, he learnt from him all the information respecting the strength and riches of the country that it was in his power to communicate. His after history was a series of treacheries to Scotland, never discovered; and in return for them, an accumulation of wealth from England, the contemplation of which seemed to be his sole enjoyment. This new offer of De Valence's was therefore greedily embraced. He happened to be at Rutherglen when Haliburton brought the proposal, and in the cloisters of its church was its fell agreement signed. He transmitted back his oath to De Valence, that he would die or win his hire: and having dispatched spies to the camp at Roslyn, as soon as he was informed of Wallace's disappearance, he judged from his knowledge of that chief's retentive affections, that whithersoever he intended finally to go, he would first visit Elderslie and the tomb of his wife. According to this opinion, he planted his emissaries in favorable situations on the road, and then proceeded to intercept his victim at the probable places.

Not finding him at Bothwell, he was just issuing forth to take the way to Elderslie, when the object of his search presented himself at the opening of the woods.

Triumphant in his deceit, this master of hypocrisy left the barn in which he had seen Wallace and his young friend lie down on that ground from which he

had determined they should never more arise. Aware that the unconquerable soul of Wallace would never allow himself to be taken alive, he had stipulated with De Valence that the delivery of his head should entitle him to a full reward. From Rutherglen to Lumloch, no place had presented itself in which he thought he could judiciously plant an ambuscade to surprise the unsuspecting Wallace. But in this village he had stationed so large a force of ruthless savages, brought for this purpose by Haliburton from the Irish island of Rathlin, that their employer had hardly a doubt of this night being the last of his too-trusting friend's existence. These Rathliners neither knew of Wallace nor his exploits; but the lower order of Scots, however they might fear to succor his distress, loved his person, and felt so bound to him by his actions, that Monteith durst not apply to any one of them to second his villainy.

The hour of midnight had passed, and yet he could not summon courage to lead his men to their nefarious attack. Twice they urged him, before he arose from his affected sleep: but guilt had *murdered sleep!* and he lay awake, restless, and longing for the dawn: and yet ere that dawn the deed was to be accomplished which was to entitle him to half the treasury of King Edward! A cock crew from a neighboring farm. "That is the sign of morning, and we have yet done nothing," exclaimed a surly ruffian, who leaned on his battle-axe in an opposite corner of the apartment. "No, it is the signal of our enemy's captivity," cried Monteith: "Follow me, but gently. If ye speak a word, or a single target rattles before ye fall upon him, we are lost! It is a being of supernatural might, and not a mere man whom you go to encounter. He that first disables him shall have a double reward."

"Depend upon us," returned they; and stealing cautiously out of the cottage after their leader, they advanced with a noiseless step towards the barn. Monteith paused at the door, making a sign to his men to halt while he listened. He put his ear to a crevice; not a murmur was heard within. He gently raised the latch, and setting the door wide open, with his finger on his lip, beckoned his followers. They breathlessly approached the threshold. The meridian moon shone full into the hovel, and shed a broad

light upon their victims. The innocent face of Edwin rested on the bosom of his friend, and the arm of Wallace lay on the straw with which he had covered the tender body of his companion. So fair a picture of mortal friendship was never before beheld. But the hearts were blind which looked on it, and Monteith giving the signal, he retreated out of the door; while his men rushed forward to bind Wallace as he lay; but the first in his eagerness, striking his head against a joist in the roof, uttered a fierce oath. The noise roused Wallace, whose wakeful senses had rather slumbered than slept, and opening his eyes he sprang on his feet. A moment told him his enemies were around. Seeing him rise, they precipitated themselves forward with imprecations. His eyes blazed like two terrible meteors, and with a sudden motion of his arm he seemed to hold them at a distance, while his godlike figure stood a tower in collected might. Awe-struck, the men paused, but it was only for an instant. The sight of Edwin now starting from his sleep, his agast countenance as he felt for his weapons, his cry when he recollected they were gone, inspired the assassins with fresh courage. Battle-axes, swords, and rattling-chains, now flashed before the eyes of Wallace. The pointed steel in a hundred places entered his body, while, with part of a broken bench which chanced to lie near him, he defended himself and Edwin from this merciless host. Edwin, seeing nought but the death of his friend flitting before his sight, regardless of himself, made a spring from his side and snatched a dagger from the belt of one of the murderers. The ruffian next him instantly caught the intrepid boy by the throat, and in that horrible clutch would in a moment have deprived him of life, had not the lion grasp of Wallace seized the man in his arms, and with a pressure that made his mouth burst out with blood, compelled him to forego his hold. Edwin released, Wallace dropped his assailant, who staggering a few paces fell senseless to the ground, and the instant after expired.

The conflict now became doubly desperate. Edwin's dagger twice defended the breast of his friend. Two of the assassins he had stabbed to the heart. "Murder that urchin!" cried Monteith, who observing from without all that

passed, and seeing the carnage of his men, feared that Wallace might yet make his escape. "Ha!" cried Wallace, at the sound of Monteith's voice giving such an order—"Then we are betrayed; but not by Heaven. Strike one of you that angel youth," cried he, "and you will incur damnation!" He spoke to the winds. They poured towards Edwin. Wallace, with a giant's strength, dispersed them as they advanced; the beam of wood fell on the heads, and struck the breasts of his assailants. Himself, bleeding at every pore, felt not a smart while he yet defended Edwin. But a shout was heard from the door; a faint cry was heard at his side. He looked round. Edwin lay extended on the ground, with an arrow quivering in his heart; his closing eyes still looked upwards to his friend. The beam fell from the hands of Wallace. He threw himself on his knees beside him. The dying boy pressed his hand to his heart, and dropped his head upon his bosom. Wallace moved not, spoke not. His hand was bathed in the blood of his friend, but not a pulse beat beneath it; no breath warmed the paralyzed chill of his face, as it hung over the motionless head of Edwin.

The men, more terrified at this unresisting stillness, than even at the invincible prowess of his arm, stood gazing on him in mute wonder. But Monteith, in whom the fell appetite of avarice had destroyed every perception of humanity, sent in other ruffians, with new thongs, to bind Wallace. They approached him with terror; two of the strongest, stealing behind him, and taking advantage of his face being bent upon that of his murdered Edwin, each in the same moment seized his hands. As they gripped them fast between both theirs, and others advanced eagerly to fasten the bands, he looked calmly up; but it was a dreadful calm, it spoke of despair, of the full completion of all woe. "Bring chains," cried one of the men, "he will burst these thongs."

"You may bind me with a hair," said he, "I contend no more." The bands were fastened on his wrists, and then turning towards the lifeless body of Edwin, he raised it gently in his arms. The rosy red of youth yet tinged his cold cheek; his parted lips still beamed with a smile; but the breath that had so sweetly informed them was flown. "Oh! my best brother that ever I had in the

world!" cried he, in a sudden transport, and kissing his pale forehead; "My sincere friend, in my greatest need! In thee was truth, manhood, and nobleness; in thee was all man's fidelity, with woman's tenderness! My friend, my brother, oh! would to God I had died for thee!"

With these noble and pitiful words we close the quotation, to continue the outline of the tragic but glorious story.

Wallace was thrown into prison in London. King Edward offered him the choice between death and the acknowledgment of the English king as king of Scotland. Wallace chose death.

Lady Helen Mar made her way secretly to London and was married to her hero in the prison. The Earl of Gloucester asked Edward to pardon the Scottish knight. But a letter from Lady Mar, who had married an English lord, accused the prisoner of all manner of evil. The pardon was refused. With Helen at his side Wallace went to the scaffold.

News of his death roused Scotland. Every clan rose to revenge the crime. With Bruce at their head, they met the whole English army at Bannockburn and drove them out of the country. Lady Mar went mad with remorse at what she had done. Gilbert Hambleton, who had renounced his English title, joined the Bruce. With him he had brought from London the body of Wallace.

All that remained of the most loyal chief in Scotland was given kingly burial. Before the bier Robert Bruce took as his wife Isabella Mar, Helen's sister. Helen, who had become a nun, was present and breathed her life away as she knelt at the coffin of her loved one.

At this awful moment the Abbot of Inchaffray came to the king, Robert Bruce, with the iron box that had been given into the care of Wallace. Bruce opened it. Inside was the regalia of Scotland (the crown and royal jewels).

"Thus Wallace crowns thee!" cried the Earl of Dunkeld, placing the crown on Bruce's head.

So Wallace's hopes were fulfilled. Scotland had freed herself from the yoke of a foreign tyrant. A Scottish king sat on the Scottish throne. No more need loyal men crouch in hidden glens. There was liberty under the lion banner.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 4645.



Four beautiful copies of statues of the time of Praxiteles.

THE FOLLOWERS OF THE GOLDEN AGE

WE are told that in the age of Phidias the flood of Greek art rose to a stupendous height and afterward slowly receded, finally leaving generations empty of greatness, like a barren, shelving beach. And we know that there is something in the nature of genius very much like that of a sea driven by mysterious tidal forces.

Why is it that the art of Phidias is acclaimed the greatest thing Greece produced? It seems as if for a period of about two hundred years a sculptor in Greece could not touch anything without making it beautiful. At first thought there appears not to be much difference between the work of about fifty years before and fifty years after the Phidian age.

We shall understand better if we remember that art is measured not so much by the technical work done by the artist's hands as by the thought that inspired him to do it. *Greek sculpture touched its pinnacle in Phidias' spiritual ideal of the pagan deity.* He could not show the gods in any other than a human form, because that is all a mortal can do. But in his statue of Zeus, the father of the gods, he showed a picture of greatness that no other Greek artist was ever able to give. When people saw it they



felt that all the grandeur of justice and goodness and truth belonged to Zeus. In the gods as Phidias presented them there could be nothing so small as jealousy and revenge, qualities that appear freely in the gods and goddesses of Greece in later art. And Phidias' ideal reflected the thought of Athens at its purest and noblest.

This same ideal touched portraiture in general. When the Argive sculptors made a statue of an athlete and labeled it with the name of a victor, they did not trouble, except in certain cases, to make it a portrait. This was not due altogether to casualness: it was surely a greater reward for a sculptor to take all the grace and strength that belong to the ideal runner or wrestler and mold them in the form of a man as a reward for an athlete, than to render an actual portrait of a single athlete who had enough of those qualities to help him once or twice to win a race.

And there were famous portraits, like that of Pericles, probably by Cresilas, a Cretan sculptor who worked much in Athens. A copy of this bust is in the British Museum, and we can see for ourselves how the sculptor has seized on the abstract, impersonal virtues that lie behind

great statesmanship and shown them in a head which happened to be physically something like that of Pericles.

In addition to its spiritual ideals, the temper of the age—the age of Greece in reaction after the Persian Wars—had much to do with the standard of its art. The people thought in terms of the nation; they were not concerned with selfish interest; their interest was given for the good of the State. And naturally the greatest work was done by sculptors thinking of Athens and Greece rather than of their own glory. When the State said, "Build me a Parthenon for the glory of Athene and of Athens," that temple was nobly built. But when, after a while, some man said, "Make me a grand statue of Athene, and I, being noble and generous, will give it to the State," then something less noble crept into the work; for the sculptor must try to please the man who was spending some of his wealth on Athens, and so he would think less of the work itself than of the effect it would have on his patron.

THREE GREAT SCULPTORS IN THE ART OF OLD GREECE

That largeness of mind that grew when Athens was the chief power of Greece and could be said to contain within herself all that there was of strength and grace, lasted for a time even after the Peloponnesian War, which took place between 431 and 404 B.C. In this war Athens was beaten by Sparta, and could no longer claim to be the prime power.

Three great names out of a large number of worthy sculptors such as Silanion, Euphranor, Timotheus, Bryaxis, Leochares—whose work was recorded by ancient writers and freely copied by the Romans—dominate the fourth century of Greek art. They are Praxiteles, Scopas and Lysippus. A little before them we have a glimpse of Cephisodotus, sometimes called the father of Praxiteles, sometimes the elder brother, but generally accepted as his master.

The chief work of Cephisodotus, which has been preserved by means of a good copy, was done in bronze about the year 370 B.C. It was a statue of the goddess Irene (peace) holding the infant god Plutus (wealth) in her arms. The marble statue copying the original is in the Munich Museum. In this statue there is nothing of the grandeur of godhead that in the figures made by Phidias so

affected the religion of the day; but there is something simple and dignified in the proportions, the pose and the treatment of drapery that remind one of Phidias. Like many other statues, this figure was cast on one of the coins of the day, and from that and other sources, among them the play called *Peace*, by Aristophanes, the Greek writer, we know that Cephisodotus' conception of the goddess of peace was a good and true one.

THE ENDURING FAME OF THE NOBLE WORK OF PRAXITELES

If six ordinary educated persons in six modern countries were asked to name the most important Greek sculptor, they would probably say Praxiteles, for Praxiteles has had more popularity than any other sculptor Greece produced. His work was regarded with something like worship by the later Greeks and by Romans, and this weight of popular opinion has influenced the judgment of nations who followed those people. The chief reason is that the work of Praxiteles was far more easily copied than that of Phidias, who was a greater genius.

A poor copy of a statue by Phidias could easily become an absurdity, because there was a spirit underlying the dignity and severe magnificence of the original which no copyist could ever reproduce. Phidias did not give the inferior mind so much to take hold of. His soul dwelt eternally in the clear, upper air, and that cannot comfortably be breathed by dwellers on the plain.

THE MASTER TOUCH OF PHIDIAS, KING OF HIS AGE

It would seem, in a way, that the farther we get from Phidias the nearer we get to him. By this we mean that in later Greek art we are always meeting with new weaknesses, and looking back and saying, "That is another sin of which Phidias would have been incapable." The work of the men who came after, led to a certain extent by Praxiteles, was more luxurious, more free and less heroic. The lines curved more; instead of "How magnificent!" people said, "How delightful, how graceful!" The gods and goddesses of the fourth and third centuries B.C. were more complacent, more easily lived with. They could be understood better, were at times happy or unhappy, jealous or generous, forgiving or revengeful—were just like human beings, except that they happened to be gods; whereas

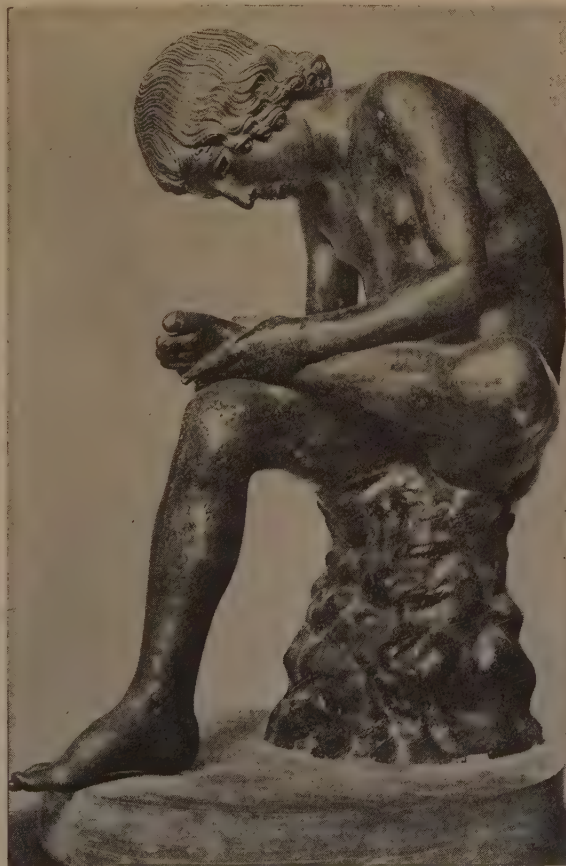
the gods of the Phidian age made their worshipers continually conscious of the pettiness of human endeavor and feeling and so kept men's souls in a state of growth.

Praxiteles was born about 380 B.C., and his work covers the best period of the fourth century. We are fortunate in having a statue actually made by him—no copy, this time. It represents the god Hermes with the baby Dionysus on his arm. The sculpture is in Parian marble—that is to say, marble quarried from the island of Paros. It is thrilling to learn that the statue was found in modern times by German excavators in the temple of Hera, at Olympia, in exactly the spot as described by Pausanias, the historian of long ago, who is the friend and guide of beauty-lovers to-day. The Hermes is now treasured in the museum at Olympia.

Art historians have learned a



A copy of the beautiful head of the Aphrodite of Cnidus.
By Praxiteles.



Spinario—the boy with the thorn in his foot—a sculpture of the time of Praxiteles.

great deal from this statue. It would seem that Praxiteles at his best was not so far removed from the Phidian age as the copies that exist of other works by him would lead us to believe. There was something of the serene and still strength of the great years in Praxiteles, and to this poise he brought a grace of his own. His mastery of the technique of marble sculpture was unequaled in Greek art. Sculptors who were attracted by the technique to try to copy him reproduced the loveliness, the suavity, the "exquisite-ness" to a certain extent, but if they could have learned his whole secret of greatness they would not have stopped at being copyists.

The Hermes shows a god who was great and noble, but had that indefinable quality of charm which it seems somewhat unnecessary and superfluous to give to gods, and which we think

of as more a feminine than a masculine attribute. The statue is familiar to us through photographs and casts. Like the Discobolus and the Venus of Milo, it is well known to all who have made any study of art. But even the most delicate photograph can in no way show the marvelous treatment of the original marble: the fine texture of the skin and hair, the working of the muscles, and the superb handling of the drapery. The Greek writer and critic Lucian, who saw the Hermes before Olympia became a ruin, said that in the treatment of the head Praxiteles excelled all that had been done before.

This genius in execution marked all the work of Praxiteles, and was doubtless one of the reasons why ancient writers spoke so much of one of his statues of which only mediocre copies now exist. This was the Aphrodite of Cnidus, regarded by some ancient writers as the most beautiful statue in all Greek art. It shows the goddess about to enter the sea, or perhaps the bath, and we are led to believe that in comparison with it the Hermes was a minor work. The best copy of the Aphrodite is in the Vatican. A beautiful head, also of Aphrodite, if not by Praxiteles, by a gifted follower, is in the possession of Lord Leconfield, in London. But, of much of Praxiteles' work described by ancient writers no trace exists.

There is a story that a friend of Praxiteles, having tried in vain to learn what he considered was his best work, resorted one day to strategy and told him that his studio was on fire. The sculptor, in sudden horror, said that if the Eros and the Satyr were not saved, his best work would be lost.

THE BEAUTIFUL STATUE THAT DREW THE PEOPLE UNTO IT

His statue of Eros, the boy-god of love, was presently set up in Thespiae, and we are told that people journeyed to the town simply to look at the statue by Praxiteles. It is lamentable that no copy exists. The Satyr, or faun, was later set up in the Street of the Tripods at Athens, and several copies have been found; the best known of these is that in the Capitol, Rome. But lately a torso has been discovered—it is now in the Louvre—and this some experts are inclined to believe is the original Satyr.

Several copies of other groups by

Praxiteles, such as the Silenus, the Artemis, the Zeus, were made in Roman times, but we know how miserably they fell short of the originals. There was one group, the Niobe, which has excited much interest among writers from Pliny downward, as it is difficult to say whether it was the work of Praxiteles or of his contemporary Scopas.

It shows Niobe and her children suffering the vengeance of Apollo and Artemis because she has boasted of her seven lovely sons and seven lovely daughters. Apollo slays the seven boys in the forest, and the arrows of Artemis (the Roman Diana, the huntress) find the girls one after the other, even to the last, whom her mother in inexpressible agony is shielding. Then the high gods take pity on Niobe as she stands there stunned by the final blow, her face uplifted and quivering, and they change her into stone, thus saving her from her own agony.

THE MEN WHO SCULPTURED THE PETTINESS OF THE GODS

This dreadful tale of petty feeling on the part of the gods was the subject of much sculpture in the later years. Many statues of the "group of the Niobids" have been found, some in Florence, some in Rome. A very fine one, the best of the group, now headless, showing one of the daughters of Niobe, is in the Vatican. It is called the Chiaramonti Niobid. Another, of one of the sons, is in the Uffizi in Florence. In that same gallery is the most pathetic of the marbles—from the point of view of the story—showing Niobe shielding her last child from the arrows of Artemis.

Scopas did not win as much regard from ancient writers as Praxiteles did, and the list of his recorded works is shorter but perhaps that was because Praxiteles was a favorite, and also because by the nature of his sculpture Scopas is limited. Like most of the Greek artists, his work is concerned with the pagan religion, the wars and struggles between the favored of the gods and their enemies. In place of the serene immobility of Phidias and the grace of Praxiteles he strove to show wrath and passion and strength in the faces he cut.

This is a very great advance on the mask-like faces of the early Greek sculpture, and somewhat prepares the way for the distorted countenances shown in the

work of later and decadent years, when it seemed that a sculptor set himself to show how much emotion it was possible for marble to reveal, and in so doing went beyond the bounds of his medium and also of good taste.

THE VIGOROUS WORK OF SCOPAS THAT IS LEFT TO US TO-DAY

Of these excesses Scopas was never in the least guilty, and he was responsible for the best of the more vigorous kind of sculpture in the fourth century. The fragments of his work left to us are partly connected with the temple at Tegea, in the Peloponnesus, and partly with a monument to Mausolus, in Asia Minor. The pediment statues at Tegea formed excited groups representing contests. Two of the heads are preserved in the National Museum of Athens, and they tell in themselves the tale of the development and originality of Scopas.

One of the reasons for the mask-like appearance of Greek faces in the fifth century had been the undeviating, smooth oval, and the prominently drawn eyes. It seemed as if the classic sculptors looked on the eye as the most important feature of the face, and therefore they made the eyeball a little too important. The upper eyelid was always cut with infinite care, and the joining of the upper and lower lids treated in a traditional, careful way.

For many generations eyes were sculptured in this manner as a matter of course. Scopas was the first man to realize in his work the fact that the play of the surrounding muscles, and the depth to which the socket was sunk under the brows, were of far more importance, from the modeler's point of view, than the actual eye and eyelid. Scopas also was the first sculptor to show men's faces rather square than in pure oval.

If we look at the faces we see around us, and, trying to forget the color of the eye and eyelashes, take a good look at the surrounding muscles, noticing the difference they make in showing anger or longing, we shall perhaps understand something of the thought of Scopas. And it may seem strange to us, accustomed as we are to all kinds of most expressive painting and sculpture, that eyes should not at the outset have been treated in this way. But the artists who make these expressive faces are in art the heirs of all the ages, and there is not a single

problem in painting or sculpture that has not been solved for them, many times over; whereas the Greeks were the inheritors of nothing save a faint tradition of Egyptian art and the art they had evolved for themselves.

This problem once solved, Scopas found many artists to follow him, and his influence on the succeeding generations, as we have said, was great. Like other sculptors, he made many single statues, and though they are described by ancient writers, for the most part they are lost. The group we should most like to have seen, said by Pliny to have been worthy of a lifetime's labor, was a group of gods and goddesses, sea-nymphs, Tritons and dolphins. The sculpture told of the carrying-off of Achilles by his mother Thetis to the Isles of the Blest.

Another wonderful statue was the Apollo Citharæus, of which a copy exists, or perhaps a statue imitating it, in the Vatican. In the British Museum is a seated figure of Demeter mourning for her daughter Persephone, who was taken away by Pluto to the underworld. This statue, made by a sculptor influenced by Scopas and Praxiteles, shows a picture of dignified and restrained grief, and reveals something of the effect Scopas had on his fellow-artists.

THE FAMOUS MONUMENT SET UP AT HALICARNASSUS

In later times this restraint would not have been possible. The exquisite taste of Greek art in the great years and those immediately following is nowhere more marked than in the innumerable stones called stelæ set up in Athens, in the Quarter of the Tombs, to mark the resting-places of the dead. A whole book could be written on them, on the shyness of sorrow in the mourning figures, the dignity of their grief. It would seem that in this sphere, as in many others, Attic art said all that could beautifully be said, and the rest of the world's work since is but a more or less clumsy imitation.

Scopas collaborated with three other sculptors—Bryaxis, Leochares and Timotheus—and with Pythius the architect-sculptor in the making of the famous monument at Halicarnassus, in Asia Minor. It was built by the order of Queen Artemisia in memory of her husband Mausolus, Prince of Caria—hence its name, the Mausoleum—and it was

called by the ancients one of the seven wonders of the world.

The Mausoleum was a pillared building with friezes and a pyramid-like summit surmounted by a marble *quadriga*, or four-horse chariot. The work on it was divided among the sculptors. Pythius, the architect, was responsible for the wonderful chariot and horses that crowned it, and Scopas chiseled the frieze on the east side.

The Mausoleum was almost entirely destroyed in 1402 by the Knights of St. John, who, we remember, were members of an order instituted in Crusading times in order to help the pilgrims to Jerusalem. When, later, they became a military power and were at war with the Turks, they captured Halicarnassus, and in the course of their fighting they ruined the lovely Mausoleum. On its site they built their castle of St. Peter, called by the Turks Budrun. Many statues of marble were sacrificed to make lime. Vandals exploring in later years destroyed still more. About the middle of the nineteenth century some portions of the frieze were brought to England, and presently the site was fully excavated.

ONE OF THE EARLIEST PORTRAITS IN GREEK SCULPTURE

Crowning the building was a colossal group of Mausolus and his queen standing in the chariot, and these figures, now in the British Museum, give us some idea of the fineness of the work. The statue of the prince is particularly interesting in that it is a definite portrait, one of the earliest in Greek sculpture.

The large Mausoleum frieze in the British Museum tells of the war with the Amazons—the tale that sculptors were so fond of portraying. A most wonderful fragment is the figure of the charioteer from the small frieze.

The treatment of the drapery in these groups is of historic interest. It shows the advance from the severe folds of classic art, and points to the possibilities of drapery in marble finally accomplished in the peerless Victory of Samothrace. This statue, which stands at the head of the staircase in the Louvre, was sculptured about the end of the fourth century, and shows the influence both of Scopas and of Lysippus. In all the centuries that have followed, no sculpture has been able to rival the marble draperies of the Samothrace Victory.

Lysippus was a native of Sicyon, a town in the Peloponnesus, and he made Sicyon art famous, just as Polyclitus brought renown to the Argive school. He produced a very great number of statues, but as he worked entirely in bronze, they have all disappeared. Lysippus was essentially a sculptor of striking or athletic types. He used to say that his masters were the Canon of Polyclitus and Nature, but he really departed from the proportions of the Canon and made a new scheme of proportions. To the work of the fourth century, so largely Attic in its best, Lysippus brought a strong strain of the Doric school. He was employed by Alexander the Great in many commissions, and produced a great variety of works—portraits of the emperor, hunting and fighting scenes, statues of athletes, and the usual representation of deities.

LYSIPPUS AND THE MONEY-BOX THAT WAS BROKEN OPEN AT HIS DEATH

There is a happy story told of Lysippus that he put a coin for every commission he held into a vase which had no opening save the narrow one through which he dropped the coins. On his death it was broken, and fifteen hundred coins came out. Had he worked in marble something might have been left out of the wreck of time. As it is, we are thankful to have some marble copies of his bronzes.

The well-known Venus of Medici, now in the Uffizi in Florence, may be a marble copy of his bronze statue. In the Dresden Museum is a fine draped figure found at Herculaneum, again a marble copy. But the statue by which Lysippus is most remembered is the famous athlete, the Apoxyomenus, in which can be seen his variation from the Doryphorus of Polyclitus, known as the Canon. The athletic type introduced by Lysippus was lighter, taller, than that of the Canon, as the marble copy of the Apoxyomenus in the Vatican shows, and this innovation had a marked effect on the sculpture of the day.

Lysippus is a strange figure in Greek art. He stands on the threshold of the new world which Alexander made, and still has kinship with the great who had gone before. He was at heart a fine, serious athletic sculptor, with many whims and perversities running through his character like veins in granite.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 4459.

GREAT SCULPTURES OF OLD GREECE



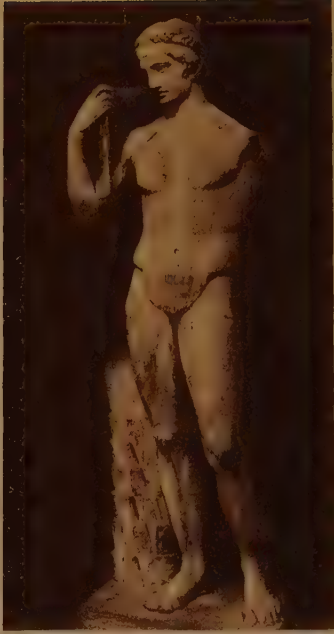
THE MATCHLESS VENUS OF MILO, IN THE LOUVRE, PROBABLY BY A PUPIL OF PHIDIAS



DORYPHORUS, THE SPEAR-BEARER, AFTER POLYCLITUS



HARMODIUS, A HERO OF ATHENS



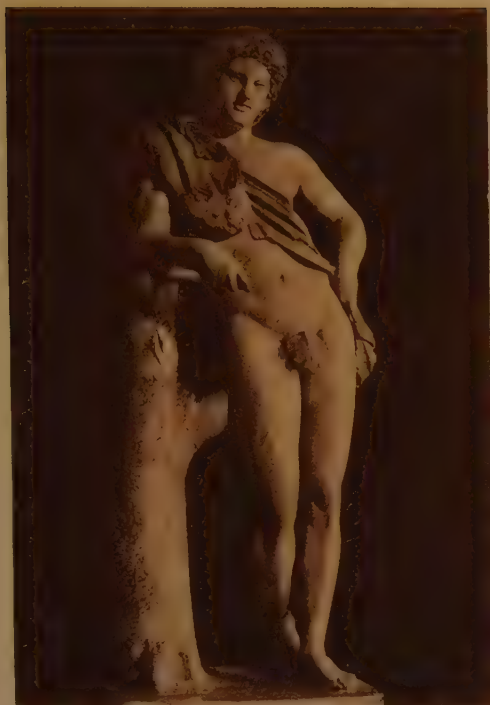
DIADUMENUS, THE VICTORIOUS ATHLETE, AFTER POLYCLITUS



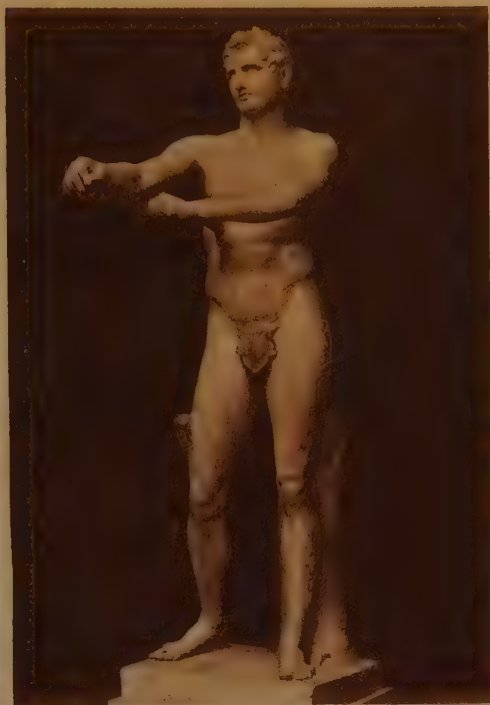
A FINE FIGURE OF AN AMAZON, AFTER POLYCLITUS



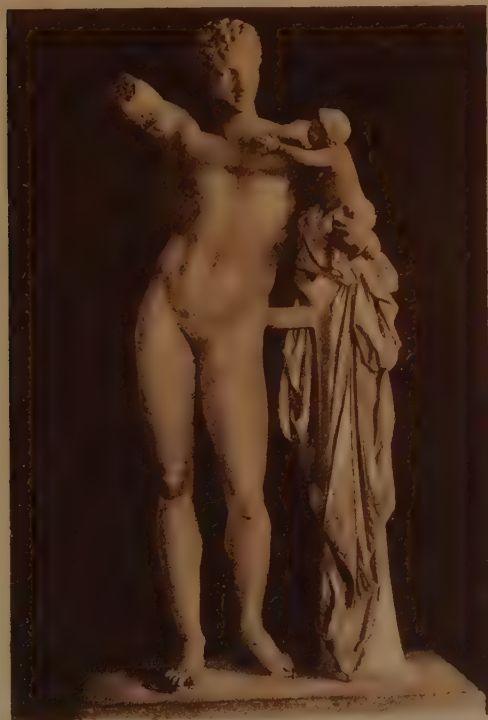
MARSYAS, SOMETIMES CALLED THE DANCING FAUN, AFTER MYRON



A COPY OF THE STATUE OF A YOUNG FAUN
BY PRAXITELES



A MARBLE COPY OF APOXYOMENUS BY
LYSIPPUS, IN THE VATICAN



THE MARBLE STATUE OF HERMES, BY PRAXITELES,
FOUND AT OLYMPIA



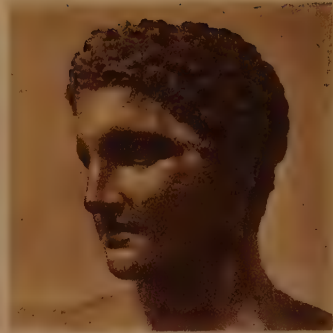
AN EARLY COPY OF A STATUE OF HERMES BY
THE SCHOOL OF PRAXITELES



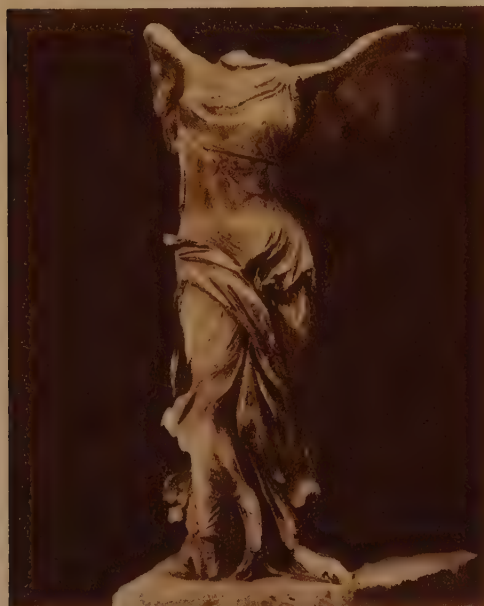
A HEAD OF HERACLES IN THE
STYLE OF SCOPAS



A BRONZE HEAD OF VENUS
FOUND IN ASIA MINOR



A BRONZE STATUE OF A YOUNG
ATHENIAN



THE VICTORY OF SAMOTHRACE, IN THE LOUVRE



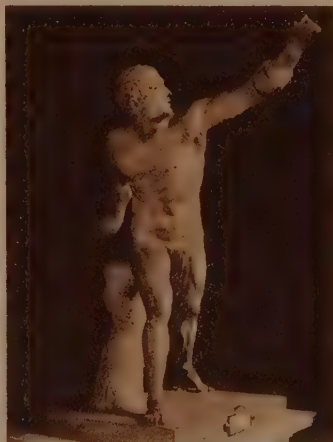
NIOBE SHIELDING HER YOUNGEST DAUGHTER



HYPNOS, OR SLEEP, A STATUE
IN THE STYLE OF PRAXITELES



A BEAUTIFUL STONE ABOVE AN
ATHENIAN TOMB



THE BORGHESI WARRIOR,
IN THE LOUVRE

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The shy beaver at work making a dam.

CANADA AND THE FUR TRADE

A FEW years ago Quebec celebrated the three-hundredth anniversary of the beginning of the fur trade in the western hemisphere. Trading in furs was the leading enterprise of the Dutch during the short period of their supremacy. It was the chief occupation of the English during the first century of their rule over the thirteen colonies and was the chief interest of the French in the days of their supremacy in Canada. In extending the fur trade Alexander Mackenzie discovered the Mackenzie River and made his way across the Rocky Mountains to the Pacific coast. David Thompson discovered the Thompson River, and Simon Fraser followed the course of the Fraser River to the sea. People now realize that the trapper, the hunter and the fur-trader have performed invaluable services in exploring and civilizing America.

The French commenced the trade. Shortly after Columbus discovered America Frenchmen were fishing for cod off the Banks of Newfoundland. These fishermen discovered that the natives on the neighboring shores had valuable furs for which they were ready to take mere trinkets. Soon many gave up their fishing to devote their entire time to the more lucrative fur trade.

During the French rule in Canada the fur trade was considered by far the most important occupation of the people. The great profits in furs were the chief incentives to further exploration and colonization. In a few years fur animals in the vicinity of settlements became scarce. Traders and trappers found it necessary to travel further and further inland. As early as the seventeenth century they traveled for months into unsettled wastes, trapping, hunting and trading with the Indians.

The rule of the priests was almost as strict as that of the Puritans in Boston or the Quakers in Philadelphia. The Church made strict laws against drinking and it was only allowed in Montreal at the annual fur fair, when all the townsfolk with their savage guests had been in the habit of becoming intoxicated from the beginning of the fur trade. Neither the trappers, when they came home to squander their money in holiday-making, nor the loafers of the cities, liked these restrictions. Many offenders, in order to escape punishment, sought the free and reckless life of the woods. It was then, for the first time, that the French trappers, hunters and canoe-men got the name of *coureurs de bois* (wood-runners), which they retained ever after when in the service of the different fur-trading

companies. Rarely did they return to their native land. The wild roving life in the wilderness was too exciting to permit a voluntary return to the narrow limits of civilization. The wood-runner as a rule took to himself an Indian wife and got along pretty well with his squaw. In addition to hunting and trapping the wood-runners became canoe-men and freighters to the trading companies. To the half-breed children of these French and Indian parents descended the vocation of their fathers and the roving in-



The best trapping-grounds are now far to the north, and the trapper has to take in his supplies and establish himself for the winter.

stincts of their mothers. To this class may be added a considerable number of "metis," the offspring of Scotch and English fathers and Indian mothers. Scattered over the vast western country, the half-breed formed the advance-guard of civilization.

THE ORIGIN OF THE HUDSON'S BAY COMPANY

While the French were developing their fur trade a strong rival appeared in the North, establishing its trading-posts in the vast wilderness surrounding Hudson Bay. In 1670 King Charles II granted to a company the exclusive privilege of trading, and the full power of governing the district drained by the rivers which flow into Hudson Bay. This great dis-

trict was called Rupert's Land because Prince Rupert, the king's cousin, was the first governor of the company. The corporation, the pioneer in its field, and the one which to-day is the largest fur-trading enterprise in the world, is the Hudson's Bay Company.

The company built many trading-posts on the shores of Hudson Bay, and from these forts carried on their trade with the Indians. In June vessels left England with merchandise and in September started homeward again, laden with furs collected from the various trading-posts. Guns and ammunition usually formed a large part of the cargoes sent to America. The company, being a trading corporation, did not make any attempt at colonization. It aimed to preserve the forests as breeding-places for animals and to keep settlers out.

INVASION OF RUPERT'S LAND BY THE FRENCH

In order to get furs the Hudson's Bay Company sent its traders to the Indian tribes inhabiting the vast wilderness to the south. They succeeded in diverting a great amount of Indian trade from the French to the northern posts. This aroused the anger of the French, so that in June, 1686, they fitted out an expedition and sent it northward to drive their rival from the Hudson Bay district. The French captured all the leading trading-posts and seized many valuable furs. During the European wars of the next few years, of which we read in the story of Germany, the posts changed hands many times. The end came with the Treaty of Utrecht in 1713, when King Louis of France surrendered all his claims to Hudson Bay and the surrounding territory. After the peace the company rebuilt many trading-posts destroyed during the struggle and opened new stations in remote places. The trade increased rapidly, and by the middle of the eighteenth century was very profitable.

THE NORTHWEST COMPANY OF SCOTCH ORIGIN

The change of flag in Canada brought a great number of Scotch merchants to Montreal and Quebec. It was not long before they learned of the profits of the fur trade and engaged extensively in it. In 1783 the chief traders founded the famous Northwest Company. The new company engaged more than two thousand *coureurs de bois* who had been trap-

ping on their own account since the English conquest. These French Canadians rendered valuable assistance, as they knew every path and stream from Labrador to the Rocky Mountains. Within a few years the trading-posts of the Northwest Company could be seen down the St. Lawrence, up the Ottawa and the Great Lakes, across the prairies to the Rockies and northward by the Athabasca and Mackenzie rivers to the Arctic Circle. Headquarters were at Montreal and the chief trading-post was first at Grand Portage, and afterward at Fort William on the northern shore of Lake Superior. Each year a solemn meeting was held in which

ers were in possession of the Saskatchewan valley, claiming that they were the legitimate successors to the old French explorers. The Hudson's Bay traders also laid claim to the rich fur region. Neither would give way, so open warfare broke out. Forts were destroyed and fur stores fired. Ruffians and murderers in the employ of both companies wreaked vengeance on the enemy. Men were murdered; women and children were tortured with all the cruelties known to the Indians. If forgotten graves could give up their secrets they could tell many a tale of massacre, of violence and of treachery between Fort Garry (now Win-



Photo, Canadian National Railways.

In the Far North the fur-trapper has to depend upon dog-teams as his method of taking in supplies and bringing out furs. His dogs are therefore a very valuable part of his equipment.

the wealthy members of the corporation made a demonstration to terrorize their savage allies and dependents.

THE CLASH BETWEEN THE TWO GREAT FUR COMPANIES

It was inevitable that the competing companies should clash sooner or later. They were divided by blood and religion as well as by trade jealousy. The employees of the Hudson's Bay Company were Scotch, almost to a man, while those of the rival were chiefly French Canadians or half-breeds and ardent Catholics. When they came together, they were always ready to fight, employing all the cruelties of Indian warfare.

The companies first came to blows on the Saskatchewan. The Northwest trad-

nipeg) and the Rockies. Neither company cared to keep records of this brutal warfare, where massacre, murders and torture were committed by paid assassins.

Finally Sir George Simpson, a young Scotsman, was appointed head of the older company. He brought peace and union, in which the Northwest Company lost its separate name and organization, and the Hudson's Bay Company once more had the monopoly of the great fur country. This was in 1821.

THE SALE OF RUPERT'S LAND TO CANADA

The growing national sentiment took shape in 1867, when four provinces were united into the Dominion of Canada. A desire soon arose to expand westward and

northward. At last the Hudson's Bay Company was induced to surrender all its rights to Rupert's Land. The Canadian Government paid the company \$1,500,000, and allowed it to hold all its posts, ten acres of ground around each of them, and to retain a twentieth of all the land within the fertile belt between Lake Winnipeg, Lake-of-the-Woods and the Rockies, and between the North Saskatchewan River and the international boundary.

British Columbia already had a government of its own, and shortly afterward became part of the Dominion.

The transfer of Rupert's Land to the

fur regions. In 1901 Revillon Frères, a wealthy French company, opened many trading-posts in the Far North and now obtains a large share of the best furs. A few small companies have entered into the trade. The old company still remains the greatest fur company in the world. It exports about two-thirds of the furs sent from the North and one-half of those sent from the whole Dominion.

THE BEAVER-SKIN, THE MONEY OF THE FUR COUNTRY

A peculiarity of the old fur trade was that money was never used as a medium of exchange in any of the posts. Every-



When the trapper in the Far North has an extensive line of traps set he sometimes camps out on different points on the line, returning to his headquarters in the cabin from time to time. This picture shows a trapper's tent and some of his pelts.

Photo, Canadian National Railways.

Dominion was made in 1870, just two centuries after Charles II had granted the charter to the company. The Hudson's Bay Company surrendered the power which it had wielded for two hundred years over a large part of North America. It still gains a large revenue from the trade in furs, and it shares with the Dominion Government in the profits which the sales of land bring through the extension of the area of cultivation. During 1910 the profits from land sales amounted to over a million dollars.

Now the fur trade was thrown open to all, but for many years few competitors entered the field. About 1890, however, independent traders were attracted to the

thing was measured in terms of skins. The skin is a very old term and is based upon the standard of the beaver-skin or, as it is called, "made-beaver." A "made-beaver" is the skin of a full-grown perfect beaver, killed in season, properly cured, and weighing from sixteen to twenty ounces. It was the uncoined money of the North. The skin did not pass in transactions, but was the unit of value, or standard, in terms of which furs or goods were measured. Traders had small sticks to represent it, and these passed as money at the stores. The custom was, of course, a return to the old days of barter that belong to primitive times and outposts of civilization.

HUNTERS AND TRAPPERS IN THE WOODS

The expert hunters and trappers of fine furs are the wood Indians, and from them are traded the greater part of the furs that come from the North. Generally peaceful, they pride themselves upon an honesty unknown to the lawless tribes of the plains. While a trader was visiting a neighboring post an Indian came to exchange his furs for goods. Finding the door locked, he broke in, took what goods he needed and left what he considered fair value in furs. Six months later the Indian came back to see if he had left enough furs for his goods.

By the beginning of November the animals have their winter coats, and fur is in season, or prime, as it is called. The trapper, who has taken up his residence in some favorite locality, now prepares to lay out his line of traps. He leads a solitary and dangerous life. To be alone in the trackless forest demands courage and endurance of no ordinary kind. Silently the trapper pursues his way; for he must not frighten away the animals by whistling or singing. The temperature is below zero, but the fur will be the finer. Fatigue and cold often exhaust him. A snowstorm may overtake him: bearings and landmarks are lost and forgotten, and he who has promised a speedy return may perhaps be seen no more.

As a trapper enters the forest his keen eyes scan every mark upon the snow for the tracks he seeks. He reads signs left behind by a passing animal as readily and truly as if he had been present and witnessed the whole scene. It matters little whether they are fresh or half blotted out, he rarely makes a mistake in his reading of the language of tracks. Where he observes the footprints of mink or marten he unstraps his pack and starts to set his traps or to make his deadfalls, which he scatters over a long line of country, maybe ten to thirty miles in length. Once a week he starts forth to visit his line, gathering the furs caught, repairing the broken traps or deadfalls and setting them again.

"THE EVIL ONE," THE ENEMY OF THE TRAPPER

The greatest enemy of the fur-hunter is the wolverine, or North American glut-ton. He follows the trapper's footsteps and destroys the animals as they are caught. This curious animal has a long

body mounted on short legs of great strength. His large and powerful feet are armed with sharp, curved claws. There is not living a more cunning and crafty animal. During winter months he lives by stealing from the traps of the hunters. He hunts day and night for the trail of man, and when he finds it, follows it unerringly until he arrives at a trap or deadfall. He will destroy the animals caught and also the traps. When once a wolverine has established himself on a trap line the hunter's only chance of success is to change ground. Such serious injury does the wolverine inflict that he has received from the Indians the name of "Evil One."

THE GATHERING-TOGETHER OF FURS FOR MARKET

At the end of March or beginning of April the trappers leave their hunting-grounds and make a journey to the trading-post with the result of their winter's toil. In their march through the forest they present a motley throng, not men only, but women, children and dogs. The braves march in front, too proud and too lazy to carry anything but their guns, and after them the squaws, either carrying loads or driving dogs attached to sleds laden with meat, furs, household goods and infants. Day by day they plod along until the post is reached. Sometimes they are met by independent traders or rival companies and are induced to sell their furs. Traders frequently visit the hunting-grounds, carrying with them goods, which they exchange for furs. There are many Indians who never visit trading-posts, but do all their trading with the traveling traders. This, however, is rather the exception than the rule. If our trapper does not dispose of his furs, he will in due time reach the trading-post. The trader values each pelt, adds the amounts together and informs the Indian that he will take fifty or sixty skins. The Indian pays for the goods advanced the last season and then picks out the articles that he needs until he exhausts his supply of tokens, each of which represents a beaver-skin.

Some years ago a trapper with his household arrived at Edmonton. He had a couple of silver-fox skins among his furs and so his pack brought a handsome sum. After supplying his wants, he traded what he had left for a baby grand piano. It was placed in front of his tent and his

children were allowed the free use of it. When the time came for his return he took a hatchet and smashed it into pieces, declaring that he wanted to know where the noise came from. Having spent his money, and with only provisions for the season, he and his family turned toward the forest for another winter in the wilderness without the comforts his foolish purchase had cost them.

TRADING WITH TREACHEROUS INDIANS

Sometimes traders have had to deal with treacherous Indians like the Blackfeet. If a Blackfoot thought a trader was deceiving him, he might not hesitate to shoot him. Every precaution in the old days was taken to protect the trader. There is in old forts a large room called the waiting-room with a connecting hallway into the trading-room. The hallway has a door, which was slid back and two Indians at a time were allowed to enter with their furs before the door was closed. The braves were admitted to a room divided into two parts. The partition was very strong and stoutly built. It contained a square opening with protecting iron bars. The Indians bartered their furs, a door opened and they departed before others were admitted. The trader

had always to be on the lookout because he could not tell at what moment the Indian might be dissatisfied with the exchange and might show his displeasure by deliberately shooting at him. In earlier days, the Indians, after they got back to the waiting-room, often thought they had been cheated and at once commenced to fill the ceiling with bullets or slash the walls with their hatchets and knives. These days are over, but there was a time when trading with the Indians was very exciting and dangerous.

THE PAY OF THE TRAPPER FOR HIS WINTER'S WORK

A good year's catch per man is about \$500, but the average is nearer \$200. The Indian remains at the post until all is spent, and then borrows on his catch for the following season. The Indian has a peculiar code of ethics. If he deliberately sets his traps and no fur animals come, he considers his debt canceled and is therefore ready to open a new account. It is often impossible for the storekeeper to collect the old debt.

Edmonton, in Alberta, is the greatest market for raw furs in Canada. More than a million dollars in value are shipped yearly from this city. Winnipeg and Montreal are also fur-trade centres.



Photo, courtesy American Museum of Natural History.

THE GRAY, OR TIMBER, WOLF

The Book of POETRY

A POEM OF SORROW, FAITH AND HOPE

AS printed among the poet's works this is a poem of one hundred and thirty-one sections, with a prologue and an epilogue. It is really a collection of short poems written on different occasions over a period of about sixteen years. In Memoriam is dedicated to the memory of a dear friend of the poet, Arthur Henry Hallam. He was expected, by all who knew him, to become one of the most notable men of England, but he died suddenly at Vienna, September 15, 1833, and was brought back by sea and buried at Clevedon, on the Bristol Channel, January 3, 1834. Tennyson's grief was so intense that for many years the death of Hallam constantly influenced his life. The sections are numbered in the order in which they occur in the whole poem.

IN MEMORIAM

STRONG Son of
God, immortal
Love,

Whom we, that
have not seen
Thy face,

By faith, and faith alone, embrace,

Believing where we cannot prove;

Thine are these orbs of light and shade;

Thou madest Life in man and brute;

Thou madest Death; and lo, Thy foot
Is on the skull which Thou hast made.

Thou wilt not leave us in the dust:

Thou madest man, he knows not why,

He thinks he was not made to die;

And Thou hast made him: Thou art just.

VII

IN GRIEF'S FIRST HOUR

Tennyson's great poem of grief begins as above, stressing at once a note of confident hope in the goodness and mercy of God and his faith in a future life. He asks God to forgive his sorrow. Overburdened by the loss of his beloved friend, he expresses his mourning in verses exquisitely sad and melodious. He fears it is "almost a sin" to try to put into words a sorrow which is too deep to be uttered. At last he finds himself wandering in the street where his friend had lived.

Dark house, by which once more I stand

Here in the long unlovely street,

Doors, where my heart was used to beat

So quickly, waiting for a hand,

A hand that can be clasp'd no more—

Behold me, for I cannot sleep,

And like a guilty thing I creep

At earliest morning to the door.

He is not here; but far away

The noise of life begins again,

And ghastly thro' the drizzling rain

On the bald street breaks the blank day.

IX

THE LAST JOURNEY OF THE DEAD

"Every pleasant spot" where the friends had been in the habit of meeting now seems dark to him. The poet's soul has now begun to feel with a new keenness in his grief, but his thoughts are again sweet and gentle when he contemplates the last journey of his dead friend over seas to the quiet resting place by the waters of the Severn.

Fair ship, that from the Italian shore
Sail'st the placid ocean-plains

CONTINUED FROM 4275

With my lost Arthur's
loved remains,
Spread thy full wings,
and wait him o'er.

So draw him home to those that
mourn

In vain: a favourable speed
Ruffle thy mirror'd mast, and
lead

Thro' prosperous floods his holy urn.

I hear the noise about thy keel;

I hear the bell struck in the night:

I see the cabin window bright;

I see the sailor at the wheel.

Thou bring'st the sailor to his wife,

And travell'd men from foreign lands;

And letters unto trembling hands;

And, thy dark freight, a vanish'd life.

So bring him: we have idle dreams:

This look of quiet flatters thus

Our home-bred fancies: O to us,

The fools of habit, sweeter seems

To rest beneath the clover sod,

That takes the sunshine and the rains,

Or where the kneeling hamlet drains

The chalice of the grapes of God;

Than if with thee the roaring wells

Should gulf him fathom-deep in brine;

And hand so often clasp'd in mine

Should toss with tangle and with shells.

XIV

IF THE LOST CAME BACK

"Is this the end of all my care?" the poet asks himself. He fancies his spirit like a dove hovering over the ship which bears the body of his friend home. He would resign himself to his sorrow and to what time may teach him. In the following verses he expresses the feeling common to human hearts: the difficulty of believing at first that a dear friend who has just died will never meet and speak to us again in this world.

If one should bring me this report,

That thou hadst touch'd the land to-day,

And I went down unto the quay,

And found thee lying in the port;

And standing, muffled round with woe,
Should see thy passengers in rank
Come stepping lightly down the plank,
And beckoning unto those they know;
And if along with these should come
The man I held as half divine;
Should strike a sudden hand in mine,
And ask a thousand things of home;
And I should tell him all my pain,
And how my life had droop'd of late,
And he should sorrow o'er my state,
And marvel what possess'd my brain;
And I perceived no touch of change,
No hint of death in all his frame,
But found him all in all the same,
I should not feel it to be strange.

XIX

NATURE'S SOOTHING INFLUENCE

The poet likens himself to some unhappy boat which has struck upon a "craggy shelf." He is stunned and confused by the sudden blow. But when he comes again to the grave of his friend, the very gentleness of the natural scenes has a soothing influence on his spirit, and he writes:

The Danube to the Severn gave
The darken'd heart that beats no more;
They laid him by the pleasant shore,
And in the hearing of the wave.
There twice a day the Severn fills:
The salt sea-water passes by,
And hushes half the babbling Wye,
And makes a silence in the hills.
The Wye is hush'd nor moved along,
And hush'd my deepest grief of all,
When fill'd with tears that cannot fall,
I brim with sorrow drowning song.
The tide flows down, the wave again
Is vocal in its wooded walls;
My deeper anguish also falls,
And I can speak a little then.

XXII

MEMORIES OF THE LOST FRIEND

His grief is still a purely personal emotion, and has not yet led him into the wider and deeper feelings which we call "universal," because they embrace mankind as a whole. It is still of their old remembered companionship he sings.

The path by which we twain did go,
Which led by tracts that pleased us well,
Thro' four sweet years arose and fell,
From flower to flower, from snow to snow:
And we with singing cheer'd the way,
And, crown'd with all the season lent,
From April on to April went,
And glad at heart from May to May:
But where the path we walk'd began
To slant the fifth autumnal slope,
As we descended following Hope,
There sat the Shadow fear'd of man;
Who broke our fair companionship,
And spread his mantle dark and cold,
And wrapt thee formless in the fold,
And dull'd the murmur on thy lip,
And bore thee where I could not see
Nor follow, tho' I walk in haste;
And think that, somewhere in the waste,
The shadow sits and waits for me.

XXV

THE SACRIFICE OF LOVE

But in the presence of this "Shadow cloaked from head to foot," which is, of course, Death, "who keeps the keys of all the creeds," the poet ponders over the great mysteries of man's life and destiny, his thoughts always revolving about memories of his friend.

I know that this was Life—the track
Whereon with equal feet we fared;
And then, as now, the day prepared
The daily burden for the back.
But this it was that made me move
As light as carrier-birds in air;
I loved the weight I had to bear,
Because it needed help of Love:
Nor could I weary, heart or limb,
When mighty Love would cleave in twain
The lading of a single pain,
And part it, giving half to him.

XXVII

THE LESSONS OF LIFE

From his personal feelings he now begins to draw the deeper lessons of life, and with more reasonable and calmer thoughts he is able to bear his loss with resignation. The last two lines of this section are often quoted.

I envy not in any moods
The captive void of noble rage,
The linnet born within the cage,
That never knew the summer's woods.
I envy not the beast that takes
His license in the field of time,
Unfetter'd by the sense of crime,
To whom a conscience never wakes;
Nor, what may count itself as blest,
The heart that never plighted troth,
But stagnates in the weeds of sloth;
Nor any want-begotten rest.
I hold it true, whate'er befall,
I feel it, when I sorrow most,
'Tis better to have loved and lost
Than never to have loved at all.

XXVIII

THE MESSAGE OF THE BELLS

With the approach of Christmastide, and all its holy memories, he finds his sorrow touched with joy. He speaks of gladness "with an awful sense of one mute shadow watching all," but ends upon the thought of hope born of God's mercy.

The time draws near the birth of Christ;
The moon is hid, the night is still,
The Christmas bells from hill to hill
Answer each other in the mist.
Four voices of four hamlets round,
From far and near, on mead and moor,
Swell out and fail, as if a door
Were shut between me and the sound:
Each voice four changes on the wind
That now dilate, and now decrease,
Peace and goodwill, goodwill and peace,
Peace and goodwill, to all mankind.
This year I slept and woke with pain,
I almost wish'd no more to wake,
And that my hold on life would break
Before I heard those bells again;
But they my troubled spirit rule,
For they controlled me when a boy;
They bring me sorrow touch'd with joy,
The merry, merry bells of Yule.

XXXIV

THE POET'S HOPE AND DOUBT

His faith in the promises of God, as revealed to us in the teachings of Jesus, is not yet absolute. His mind is not without its doubts, but he has emerged from his darkest sorrow with the hope that the grave is not the end of all.

My own dim life should teach me this,
That life shall live for evermore,
Else death is darkness at the core,
And dust and ashes all that is;

This round of green, this orb of flame,
Fantastic beauty; such as lurks
In some wild Poet, when he works
Without a conscience or an aim.

What then were God to such as I?
'Twere hardly worth my while to choose
Of things all mortal, or to use
A little patience ere I die.

'Twere best at once to sink to peace,
Like birds the charming serpent draws,
To top head-foremost in the jaws
Of vacant darkness and to cease.

XXXVIII

DO THE DEPARTED THINK OF US?

It is springtime again, and the poet still is singing his mournful songs in memory of his friend. For the first time we find him wondering whether the spirit of his friend is interested in the life on earth, and cares to hear these songs of his.

With weary steps I loiter on,
Tho' always under alter'd skies,
The purple from the distance dies,
My prospect and horizon gone.

No joy the blowing season gives,
The herald melodies of spring,
But in the songs I love to sing
A doubtful gleam of solace lives.

If any care for what is here
Survive in spirits render'd free,
Then are these songs I sing of thee
Not all ungrateful to thine ear.

LIV

FAITH IN GOD'S WORLD

In the verses that follow he goes on to speculate upon the life of the departed. "How fares it with the happy dead?" Life here has vanished, but are there not flashes of memory? The soul is ever the same soul and not another. Finally the poet announces his faith that nothing in God's world shall be destroyed or lost, in one of the finest sections of the poem.

Oh, yet we trust that somehow good
Will be the final goal of ill,
To pangs of nature, sins of will,
Defects of doubt, and taints of blood;
That nothing walks with aimless feet;
That not one life shall be destroyed,
Or cast as rubbish to the void,
When God hath made the pile complete;

That not a worm is cloven in vain;
That not a moth with vain desire
Is shrivell'd in a fruitless fire,
Or but subserves another's gain.

Behold, we know not anything;
I can but trust that good shall fall
At last—far off—at last, to all,
And every winter change to spring.

So runs my dream: but what am I?

An infant crying in the night:

An infant crying for the light:

And with no language but a cry.

LXIV

THE HUMILITY OF LOVE

A calmer mood descends upon his aching heart—he will strive to put sorrow aside and achieve a nobler state of mind. "The song of woe is after all an earthly song." But again he touches the trembling chords of grief in words so sad and musical that few can read them without a tear, and surely no one who has ever lost a dear friend. He ponders whether his friend, removed so far from the common life of everyday into a sublimer sphere, can still care for one so humble and unworthy as himself. Does he still feel "a distant dearth in the hill, a secret sweetness in the stream"? Does he look back and still remember his old friend?

Dost thou look back on what hath been,
As some divinely gifted man,
Whose life in low estate began
And on a simple village green;

Who breaks his birth's invidious bar,
And grasps the skirts of happy chance,
And breasts the blows of circumstance,
And grapples with his evil star;

Who makes by force his merit known
And lives to clutch the golden keys,
To mould a mighty state's decrees,
And shape the whisper of the throne;

And moving up from high to higher,
Becomes on Fortune's crowning slope
The pillar of a people's hope,
The centre of a world's desire;

Yet feels, as in a pensive dream,
When all his active powers are still,
A distant dearth in the hill,
A secret sweetness in the stream,

The limit of his narrower fate,
While yet beside its vocal springs
He play'd at counsellors and kings,
With one that was his earliest mate;

Who ploughs with pain his native lea
And reaps the labour of his hands,
Or in the furrow musing stands;
"Does my old friend remember me?"

LXXXIII

THE COMING OF SPRING

The poet has come to the conviction that no change wrought upon the earthly form of his friend can change his soul. In this beautiful song of awakening spring his sorrow is influenced by the changing season and "longs to burst its frozen bud" and flower again in a new pean of praise.

Dip down upon the northern shore,
O sweet new year delaying long;
Thou doest expectant Nature wrong,
Delaying long; delay no more.

What stays thee from the clouded noons,
Thy sweetness from its proper place?
Can trouble live with April days,
Or sadness in the summer moons?

Bring orchid, bring the foxglove spire,
The little speedwell's darling blue,
Deep tulips dash'd with fiery dew,
Laburnums, drooping-wells of fire.

O thou, new year, delaying long,
Delayest the sorrow in my blood,
That longs to burst a frozen bud
And flood a fresher throat with song.

LXXXIV

WHAT MIGHT HAVE BEEN

In this section the poet's thoughts are running upon the kind of life which would have been theirs in the family circle if Arthur Hallam had lived to wed his sister.

When I contemplate all alone
The life that had been thine below,
And fix my thoughts on all the glow
To which thy crescent would have grown,
I see thee sitting crown'd with good,
A central warmth diffusing bliss
In glance and smile, and clasp and kiss,
On all the branches of thy blood;
Thy blood, my friend, and partly mine;
For now the day was drawing on,
When thou shouldst link thy life with one
Of mine own house, and boys of thine
Had babbled "Uncle" on my knee;
But that remorseless iron hour
Made cypress of her orange flower,
Despair of Hope, and earth of thee.
I seem to meet their least desire,
To clap their cheeks, to call them mine.
I see their unborn faces shine
Beside the never-lighted fire.
I see myself an honour'd guest,
Thy partner in the flowery walk
Of letters, genial table-talk,
Or deep dispute, and graceful jest;
While now thy prosperous labour fills
The lips of men with honest praise,
And sun by sun the happy days
Descend below the golden hills
With promise of a morn as fair;
And all the train of bounteous hours
Conduct by paths of growing powers
To reverence and the silver hair;
Till slowly worn her earthly robe,
Her lavish mission richly wrought,
Leaving great legacies of thought,
Thy spirit should fail from off the globe.
What time mine own might also flee,
As link'd with thine in love and fate,
And, hovering o'er the dolorous strait
To the other shores involved in thee;
Arrive at last the blessed goal,
And He that died in Holy Land
Would reach us out the shining hand,
And take us as a single soul.
What reed was that on which I leant?
Ah, backward fancy, wherefore wake
The old bitterness again, and break
The low beginnings of content.

LXXXVII

FAMILIAR SCENES REVISITED

The poet visits Cambridge, where the friends had passed their college years together. The memories come crowding, but without so deep a sense of personal loss as heretofore. The gloom has lifted from the poet's mind.

I passed beside the reverend walls
In which of old I wore the gown;
I roved at random thro' the town,
And saw the tumult of the halls;
And heard once more in college fanes
The storm their high-built organs make,
And thunder-music, rolling, shake
The prophets blazon'd on the panes:

And caught once more the distant shout.
The measured pulse of racing oars
Among the willows; paced the shores
And many a bridge, and all about

The same grey flats again, and felt
The same, but not the same; and last
Up that long walk of limes I passed
To see the rooms in which he dwelt.

Another name was on the door:
I linger'd; all within was noise
Of songs, and clapping hands, and boys
That crash'd the glass, and beat the floor;

Where once we held debate, a band
Of youthful friends, on mind and art
And labour, and the changing mart,
And all the framework of the land;

When one would aim an arrow fair,
But send it slackly from the string;
And one would pierce an outer ring,
And one an inner, here and there;

And last the master-bowman, he,
Would cleave the mark. A willing ear
We lent him. Who, but hung to hear
The rapt oration flowing free

From point to point, with power and grace
And music in the bounds of law,
To those conclusions when we saw
The God within him light his face,

And seem to lift the form, and glow
In azure orbits heavenly-wise;
And over those ethereal eyes
The bar of Michael Angelo.

CCXV

THE MINGLING OF JOY AND REGRET

Through many sections of the poem the writer recalls events in his friendship with his lost companion. There is now no wavering note of doubt when he sings of the greater things of life and immortality. Another Christmas finds him calm of mind and strong in faith, as when he sings, "Ring out, wild bells, to the wild sky," and ends that song (see page 6109) with the joyous note "Ring in the Christ that is to be." With another spring comes returning happiness.

Now fades the last long streak of snow,
Now burgeons every maze of quick
About the flowering squares, and thick
By ashen roots the violets blow.

Now rings the woodland loud and long,
The distance takes a lovelier hue,
And drown'd in yonder living blue
The lark becomes a sightless song.

Now dance the lights on lawn and lea,
The flocks are whiter down the vale,
And milkier every milky sail
On winding stream or distant sea;

Where now the seamew pipes, or dives
In yonder greening gleam, and fly
The happy birds, that change their sky
To build and brood; that live their lives

From land to land; and in my breast
Spring wakens too; and my regret
Becomes an April violet,
And buds and blossoms like the rest.

CXVI

WHAT TIME HAS TAUGHT THE POET

At last the poet's purely personal grief has passed away. Time has indeed taught him wisdom, and the confident hope that far better than unavailing sorrow for the dead is the steady faith in the reunion of friends in after-life, "some strong bond which is to be."

Is it, then, regret for buried time
That keenlier in sweet April wakes,
And meets the year, and gives and takes
The colours of the crescent prime?

Not all: the songs, the stirring air,
The life re-orient out of dust,
Cry thro' the sense to hearten trust
In that which made the world so fair.

Not all regret: the face will shine
Upon me, while I muse alone;
And that dear voice, I once have known,
Still speak to me of me and mine.

THE FLIGHT OF PETER BELL

The lines given here are the introductory verses to a long poem by William Wordsworth entitled *Peter Bell: A Tale*. The whole is a fanciful and not unprofitable story, but the poet's imagination is seen in its most attractive guise in these introductory verses.

THERE'S something in a flying horse,
There's something in a huge balloon;
But through the clouds I'll never float
Until I have a little Boat
Shaped like the crescent-moon.

And now I have a little Boat,
In shape a very crescent-moon;
Fast through the clouds my Boat can sail;
But if perchance your faith should fail,
Look up—and you shall see me soon!

The woods, my Friends, are round you roaring,
Rocking and roaring like a sea;
The noise of danger's in your ears,
And ye have all a thousand fears
Both for my little Boat and me!

Meanwhile untroubled I admire
The pointed horns of my canoe;
And did not pity touch my breast,
To see how ye are all distrust,
Till my ribs ached, I'd laugh at you!

Away we go, my Boat and I—
Frail man ne'er sate in such another;
Whether among the winds we strive,
Or deep into the clouds we dive,
Each is contented with the other.

Away we go—and what care we
For reason, tumults, and for wars?
We are as calm in our delight
As is the crescent-moon so bright
Among the scattered stars.

Up goes my Boat among the stars
Through many a breathless field of light,
Through many a long blue field of ether,
Leaving ten thousand stars beneath her:
Up goes my little Boat so bright.

The Crab, the Scorpion, and the Bull—
We pry among them all; have shot

Yet less of sorrow lives in me
For days of happy commune dead;
Less yearning for the friendship fled,
Than some strong bond which is to be.

THE GOAL OF MAN

In the epilogue, the last thoughts of the poet, freed from all contemplation of his own feelings, are with mankind as a whole. In his vision he sees the ultimate triumph of life over death, of good over evil. Man is not merely animal but capable of love and suffering and hope, and these are but the seeds of what will flower and bear fruit in the after-life of the soul.

Whereof the man, that with me trod
This planet, was a noble type
Appearing ere the times were ripe,
That friend of mine who lives in God;

That God, which ever lives and loves,
One God, one law, one element,
And one far-off divine event,
To which the whole creation moves.

High o'er the red-haired race of Mars,
Covered from top to toe with scars;
Such company I like it not.

The towns in Saturn are decayed,
And melancholy Sceptres throng them—
The Pleiads, that appear to kiss
Each other in the vast abyss,
With joy I sail among them.

Swift Mercury resounds with mirth,
Great Jove is full of stately bowers;
But these, and all that they contain,
What are they to that tiny grain—
That little Earth of ours?

Then back to Earth, the dear green Earth—
Whole ages if I here should roam,
The worlds for my remarks and me,
Would not a whit the better be;
I've left my heart at home.

See! there she is, the matchless Earth!
There spreads the famous Pacific Ocean!
Old Andes thrusts yon craggy spear
Through the grey clouds; the Alps are here,
Like waters in commotion.

Yon tawny slip is Libya's sands,
That silver thread the river Dnieper;
And look, where clothed in brightest green
Is a sweet isle, of isles the Queen;
Ye fairies, from all evil keep her.

And see the town where I was born!
Around those happy fields we span
In boyish gambols; I was lost
Where I have been, but on this coast
I feel I am a man.

Never did fifty things at once
Appear so lovely, never, never.
How tunefully the forests ring!
To hear the earth's soft murmuring
Thus could I hang for ever.

ARMAGEDDON*

Armageddon is the name given to the place whereon it is said that God will one day gather all His enemies and destroy them forever. The idea of such a poetic ending to the forces of evil that prevail in the world is often used by writers, and in this fine poem by Sir Edwin Arnold, who was born June 10, 1822, and died in 1904, it is made the theme of a stirring "war poem of the future"; the eventual great battle in which the right will prevail.

MARCHING down to Armageddon—
Brothers, stout and strong!
Let us cheer the way we tread on
With a soldier's song!
Faint we by the weary road,
Or fall we in the rout,
Dirge or Pæan, Death or Triumph!
Let the song ring out!

We are they who scorn the scorers—
Love the lovers—hate
None within the world's four corners—
All must share one fate;
We are they whose common banner
Bears no badge or sign,
Save the light which dyes it white—
The Hope that makes it shine.

We are they whose bugle rings,
That all the wars may cease;
We are they who pay the Kings
Their cruel price for Peace;
We are they whose steadfast watchword
Is what Christ did teach,
"Each man for his Brother first—
And Heaven, then, for each."

We are they who will not falter—
Many swords or few—
Till we make this earth the altar
Of a worship new;
We are they who will not take
From palace, priest, or code,
A meaner Law than "Brotherhood"—
A lower Lord than God.

Marching down to Armageddon—
Brothers, stout and strong!
Ask not why the way we tread on
Is so rough and long!
God will tell us when our spirits
Grow to grasp His plan!
Let us do our part to-day—
And help Him, helping Man!

Shall we even curse the madness,
Which for "ends of State"
Dooms us to the long, long sadness
Of this human hate?
Let us slay in perfect pity
Those that must not live;
Vanquish, and forgive our foes—
Or fall—and still forgive.

We are those whose unpaid legions,
In free ranks arrayed,
Massacred in many regions—
Never once were stayed;
We are those whose torn battalions,
Trained to bleed, not fly,
Make our agonies a triumph—
Conquer, while we die!

*By permission of Kegan, Paul & Co.

Therefore, down to Armageddon—
Brothers, bold and strong;
Cheer the glorious way we tread on
With this soldier's song!
Let the armies of the old Flags
March in silent dread!
Death and Life are one to us,
Who fight for Quick and Dead!

WITH A COPY OF HERRICK

Edmund Gosse, a universally honored English critic, has the high qualification of being himself a true poet, though his ambitious flights have not been many. In these verses on Robert Herrick he makes poetry of criticism. Could Herrick's love of flowers, and his dainty touch, be more poetically suggested?

FRESH with all airs of woodland brooks
And scents of showers,
Take to your haunt of holy books
This saint of flowers.

When meadows burn with budding May,
And heaven is blue,
Before his shrine our prayers we say,
Saint Robin true.

Love crowned with thorns is on his staff,
Thorns of sweet-briar;
His benediction is a laugh,
Birds are his choir.

His sacred robe of white and red
Uncution distils;
He hath a nimbus round his head
Of daffodils.

MEMORY

Thomas Bailey Aldrich, well-known American poet, expresses in these lines a curious fact which most people have experienced. Some quite unimportant events in our lives will be remembered better than we can ever remember those which are supposed to be of far greater importance. Perhaps Memory is wiser than we are in thus calling to our mind the things of which we had taken least account.

MY mind lets go a thousand things,
Like dates of wars and deaths of kings,
And yet recalls the very hour—
'Twas noon by yonder village tower,
And on the last blue moon in May—
The wind came briskly up this way,
Crisping the brook beside the road;
Then, pausing here, set down its load
Of pine-scents, and shook listlessly
Two petals from that wild-rose tree.

ROSE AND ROOT

John James Platt, the writer of this little fable in verse, was an American poet of some distinction, born in 1835. The moral of the tiny story is that the real reward of good work is in the knowledge which the worker possesses of doing the good work for its own sake.

THE rose aloft in sunny air,
Beloved alike by bird and bee,
Takes for the dark root little care,
That toils below it ceaselessly.
I put my question to the flower:
"Pride of the summer, garden queen,
Why livest thou thy little hour?"
And the rose answered: "I am seen."
I put the question to the root,
"I mine the earth, content," it said,
"A hidden miner underfoot:
I know a rose is overhead."

TO THE LORD GENERAL
CROMWELL

In this great sonnet Milton addresses Oliver Cromwell before he has been declared Protector of the Commonwealth. The poet rejoices in the victories of the Puritan arms, but reminds the great soldier that in the time of peace that is coming the foes of religious freedom are still to be fought.

CROMWELL, our chief of men, who
through a cloud
Not of war only, but detractions rude,
Guided by faith and matchless fortitude,
To peace and truth thy glorious way hast
ploughed,
And on the neck of crowned fortune proud
Hast reared God's trophies, and His work
pursued,
While Darwen stream with blood of Scots
imbrued
And Dunbar field resounds thy praises loud,
And Worcester's laureate wreath. Yet much
remains
To conquer still; peace hath her victories
No less renowned than war: new foes arise
Threatening to bind our souls with secular
chains;
Help us to save free conscience from the
paw
Of hireling wolves, whose gospel is their
maw.

LONDON, 1802

This famous sonnet by William Wordsworth was composed in London, as the title indicates, at a period when the outlook for England was somewhat doubtful, as Napoleon was lordling it over Europe. The poet was impressed by the need of some great voice, like that of Milton's, to inspire the nation with patriotic fervor. Though no great poet arose, circumstances forced the British people to a supreme effort, and not many years later Napoleon was a prisoner of the British on the lonely island of St. Helena.

MILTON! thou shouldst be living at this
hour;
England hath need of thee; she is a fen
Of stagnant waters: altar, sword, and pen,
Fireside, the heroic wealth of hall and bower,
Have forfeited their ancient English dower
Of inward happiness. We are selfish men;
Oh! raise us up, return to us again;
And give us manners, virtue, freedom, power.
Thy soul was like a Star, and dwelt apart;
Thou hadst a voice whose sound was like the
sea:
Pure as the naked heavens—majestic, free—
So didst thou travel on life's common way,
In cheerful godliness; and yet thy heart
The lowliest duties on herself didst lay.

THE ELIXIR

George Herbert is one of the finest religious poets that have written in the English language. He came of a noble family, being born at Montgomery Castle, Wales, on April 3, 1593. He died on March 3, 1633, and his life was written by Izaak Walton. This is a good example of his poetry, and it is given in the quaint spelling of his time. The "Elixir" was a supposed magic stone that changed base metal into gold.

TEACH me, my God and King,
In all things Thee to see;
And what I do in anything,
To do it as for Thee.
Not rudely, as a beast,
To runne into an action;

But still to make Thee prepossest,
And give it his perfection.

A man that looks on glasse,
On it may stay his eye;
Or, if he pleaseth, through it passe,
And then the heaven espie.

All may of Thee partake:
Nothing can be so mean
Which with his tincture (for Thy sake)
Will not grow bright and clean.

A servant with this clause
Makes drudgerie divine:
Who sweeps a room, as for Thy laws,
Makes that and th' action fine.

This is the famous stone
That turneth all to gold;
For that which God doth touch and own
Cannot for lesse be told.

ABIDE WITH ME

There are few hymns in our language more popular throughout the churches than this. An interesting story attaches to the writing of it. The author was a well-known minister and hymn-writer named H. F. Lyte (see page 4440), and he wrote these verses in the evening of the Sunday on which he preached his last sermon. It is thus a very real expression of the human heart leaning in its last hours of life upon the Creator. Abide with Me is not, as many suppose, an evening hymn, but a hymn of a closing life.

ABIDE with me! fast falls the eventide,
The darkness deepens: Lord, with me
abide!
When other helpers fail, and comforts flee,
Help of the helpless, oh, abide with me!
Swift to its close ebbs out life's little day;
Earth's joys grow dim; its glories pass away;
Change and decay in all around I see:
O Thou, who changest not, abide with me!
Not a brief glance I beg, a passing word,
But as Thou dwelt'st with Thy disciples,
Lord—
Familiar, condescending, patient, free—
Come, not to sojourn, but abide with me!
Come not in terrors, as the King of kings:
But kind and good, with healing in Thy
wings;
Tears for all woes, a heart for every plea;
Come, Friend of sinners, and thus 'bide with
me!
I need Thy presence every passing hour;
What but Thy grace can foil the tempter's
power?
Who like Thyself my guide and stay can be?
Through cloud and sunshine, oh, abide with
me!
I fear no foe, with Thee at hand to bless:
Ills have no weight, and tears no bitterness:
Where is Death's sting? Where, Grave, thy
victory?
I triumph still, if Thou abide with me.
Hold then Thy cross before my closing eyes!
Shine through the gloom, and point me to the
skies!
Heaven's morning breaks; and earth's vain
shadows flee:
In life and death, O Lord, abide with me!

INCIDENT OF THE FRENCH CAMP

In this poem Robert Browning relates a real event which happened in Napoleon's war with Austria in 1809. The only difference between the poet's account of the incident and the actual episode is that the hero was a man.

YOU know, we French stormed Ratisbon:
A mile or so away,
On a little mound, Napoleon
Stood on our storming day;
With neck out-thrust, you fancy how,
Legs wide, arms locked behind,
As if to balance the prone brow
Oppressive with its mind.
Just as perhaps he mused, "My plans
That soar to earth may fall,
Let once my army leader, Lannes,
Waver at yonder wall."—
Out 'twixt the battery-smokes there flew
A rider, bound on bound
Full galloping; nor bridle drew
Until he reached the mound.
Then off there flung in smiling joy,
And held himself erect
By just his horse's mane, a boy;
You hardly could suspect—
(So tight he kept his lips compressed,
Scarce any blood came through)—
You looked twice ere you saw his breast
Was all but shot in two.
"Well," cried he, "Emperor, by God's grace
We've got you Ratisbon!
The Marshal's in the market-place,
And you'll be there anon
To see your flag-bird flap his vans
Where I, to heart's desire,
Perched him!" The chief's eye flashed; his
plans
Soared up again like fire.
The chief's eye flashed; but presently
Softened itself, as sheathes
A film the mother-eagle's eye
When her bruised eaglet breathes;
"You're wounded!" "Nay," his soldier's
pride
Touched to the quick, he said:
"I'm killed, Sire!" And his chief beside,
Smiling the boy fell dead.

PEACE

Henry Vaughan was the name of a doctor who lived from 1622 to 1695 and wrote many religious poems.

MY soul, there is a country
Afar beyond the stars,
Where stands a wingèd sentry,
All skilful in the wars.
There, above noise and danger,
Sweet Peace sits crowned with smiles,
And One born in a manger
Commands the beauteous files.
He is thy gracious Friend,
And—O my soul, awake!—
Did in pure love descend
To die here for thy sake.
If thou canst get but thither,
There grows the flower of Peace—
The Rose that cannot wither—
Thy fortress, and thy ease.
Leave, then, thy foolish ranges;
For none can thee secure,
But One who never changes—
Thy God, thy Life, thy Cure.

THE BUILDERS

Longfellow in this poem reminds us that in every action of our lives we are building the house of our future. That is to say, what we do well or ill to-day will mean much in the days to come.

ALL are architects of fate,
Working in these walls of time:
Some with massive deeds and great,
Some with ornaments of rhyme.
Nothing useless is or low;
Each thing in its place is best;
And what seems but idle show
Strengthens and supports the rest.
For the structure that we raise
Time is with materials filled;
Our to-days and yesterdays
Are the blocks with which we build.
Truly shape and fashion these,
Leave no yawning gaps between;
Think not, because no man sees,
Such things will remain unseen.

JESUS BIDS US SHINE

This poem has long been popular as a children's hymn. The author is Emily H. Miller.

JESUS bids us shine
With a pure, clear light;
Like a little candle
Burning in the night,
In this world of darkness,
So we must shine—
You in your small corner,
And I in mine.
Jesus bids us shine,
First of all for Him;
Well He sees and knows it
If our light is dim.
He looks down from heaven
To see us shine—
You in your small corner,
And I in mine.
Jesus bids us shine,
Then, for all around;
Many kinds of darkness
In the world abound.
Sin and want and sorrow;
So we must shine—
You in your small corner,
And I in mine.

COMPOSED UPON WESTMINSTER BRIDGE

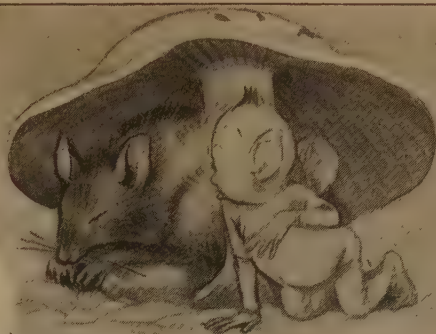
There are probably no lines about London more often quoted than these of Wordsworth's fine sonnet. It was written one summer morning in 1802 when driving over Westminster Bridge on his way to Dover.

EARTH has not anything to show more
fair:
Dull would he be of soul who could pass by
A sight so touching in its majesty:
This City now doth like a garment wear
The beauty of the morning: silent, bare,
Ships, towers, domes, theatres, and temples lie
Open unto the fields, and to the sky,
All bright and glittering in the smokeless air.
Never did sun more beautifully steep
In his first splendour valley, rock, or hill;
Ne'er saw I, never felt, a calm so deep!
The river glideth at his own sweet will:
Dear God! the very houses seem asleep;
And all that mighty heart is lying still!

LITTLE VERSES FOR VERY LITTLE PEOPLE

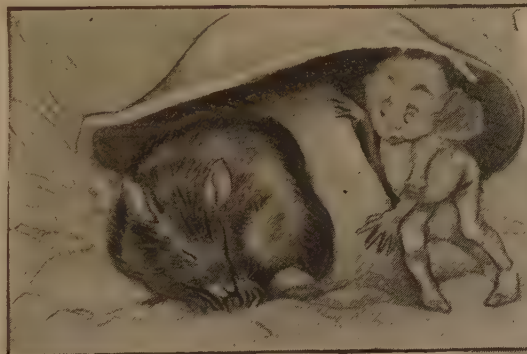
UNDER a toadstool
Crept a wee Elf,
Out of the rain,
To shelter himself.

Under the toadstool,
Sound asleep,
Sat a big Dormouse
All in a heap.



Trembled the wee Elf,
Frightened, and yet
Fearing to fly away
Lest he get wet.

To the next shelter—
Maybe a mile!
Sudden the wee Elf
Smiled a wee smile.



Tugged till the toadstool
Topped in two.
Holding it over him,
Gaily he flew.

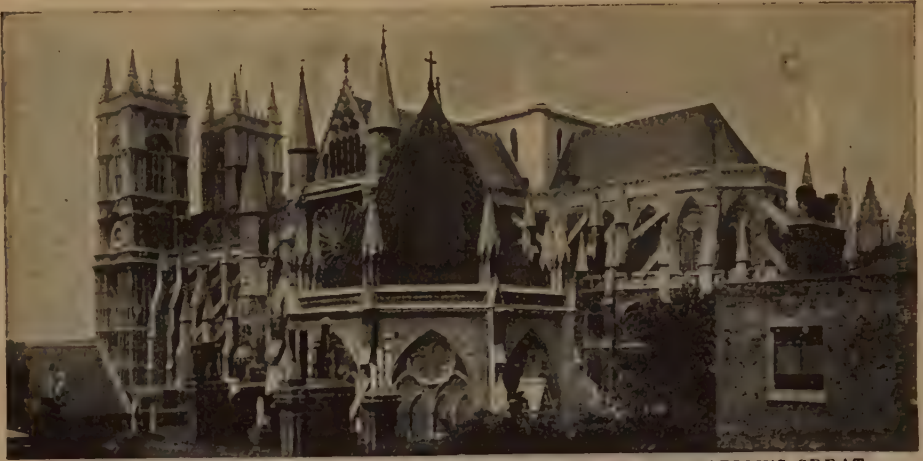
Soon he was safe home,
Dry as could be.
Soon woke the Dormouse—
"Good gracious me!"



"Where is my toadstool?"
Loud he lamented—
And that's how umbrellas
First were invented.



THE ABBEY, THE WORK OF MANY GENERATIONS



WESTMINSTER ABBEY, THE LAST RESTING-PLACE OF THE NATION'S GREAT



THE WONDROUS BEAUTY OF HENRY VII'S CHAPEL IN THE ABBEY

Westminster Abbey, to the building of which many generations of dreamers, thinkers and workers gave their best effort, is an excellent example of what is known as pointed, or Gothic, architecture. The beautiful chapel of Henry VII is at the east end. You can see its position at the right in the picture above. From the lower photograph, showing the interior of the chapel, you will get an impression of high-springing arches and exquisite tracery. Above the stalls hang banners of the Knights of the Bath.

The Book of MEN AND WOMEN



London's dome and pointing spires, from the Thames.

GREAT BUILDERS OF LONDON

THE history of London is different from the history of other great cities of the world. The splendors of Babylon and Nineveh cost little, for there were thousands of slaves to do the work for scarcely more than the cost of their food. Rome was made splendid by emperors who ruled all the known earth. They had countless slaves. They robbed every country to make their own city gorgeous, and with the great wealth of the world they built palaces and halls and theatres and circuses grander than any which have since been made. Florence was built by rulers who loved art and beauty. They lived in an age when the greatest sculptors and painters could be employed for as little cost as an ordinary workman of to-day.

London was a wilderness when the Romans went there. Had they stayed, they would have made it a grand city. But they were called home to defend their own capital, and London was burned again and again by rough men from over the seas. The Saxons and Danes were an uneducated people, who thought of little more than war and the chase, not of building noble cities. The Normans, who conquered England in the eleventh century, were a more educated people, and there are traces of their buildings in London and many parts of England. But their kings were warlike men who never thought of making a beautiful London. When the time came for giving London wealth and power, the people were too busy with trade and travel to think much of making a stately city. There

CONTINUED FROM 4214



was no call for great architects and builders, so England did not produce them.

When such men did arise, the city had been built up haphazard, we may say, and it was impossible to put noble buildings in the best positions, or to make broad roads where wretched, crooked little streets of houses already existed. It is, therefore, a city of surprises with many gems in unworthy settings.

It is impossible to point out all the historic buildings as being the work of this or that man. The beautiful Westminster Abbey was begun on the site of an older church built by Edward the Confessor, who died in 1066. A foreigner, William the Conqueror, was crowned king of England, the same year, in the cathedral which Edward had built to be a shrine for his own bones. Through century after century important additions continued to be made under various kings. The western towers, built to a considerable extent after the designs of the great architect Sir Christopher Wren, were not completed until 1740.

Nearly all the kings and queens of England since the Conquest have been crowned in the Abbey; and within its walls lie buried kings and queens, statesmen, poets, artists, travelers, missionaries, reformers—men and women whose names are not forgotten. In the Confessor's chapel stands the old coronation chair, made for Edward I and used since by sovereign after sovereign. And in the beautiful chapel known as Henry VII's is one of the finest of all the tombs—that of Henry VII and his wife.

THE MEN WHO BUILT THE TOWER

THE Tower of London is the oldest fortress-prison in Europe. Much of the building which we see to-day, standing in gloomy strength overlooking the Thames, has stood there for over 800 years. But under the present tower are the remains of another fortress, which is a thousand years older than this.

London was always the first important place to be seized when enemies invaded the land, and the site of the Tower was seen by all soldiers to be the best for defense. Julius Cæsar is said to have made a fortress there. Certainly the White Tower is built upon Roman foundations, and remains of Roman walls are to be found in other parts of the Tower. London was often burned and pillaged—it was once so ruined by the Danes that the whole city was desolate, with no one living in it, for thirty years. But when people returned and the wars died down, they always gathered about the Tower as a place of defense and strength. Alfred the Great was the founder of modern London, and he is said to have built another great fortress where the Romans had first built the Tower.

THE WEEPING MONK WHO CAME FROM THE EAST TO BUILD THE TOWER

But it was William the Conqueror who began the Tower which is so famous to-day. Although he had conquered England, he felt that he would never be safe until he had built himself a great castle in which he could be surrounded by troops who would keep him safe in case the Saxons should rise in rebellion against him.

And who was the man he chose to build the Tower for him? It was a monk. His name was Gundulf, and he was born in Normandy in 1024, and was forty-six when William called him to England to begin this great work.

Gundulf was a learned man. He had made a pilgrimage to Jerusalem, and by living in the East had learned many of the secrets by which the Saracens made their buildings beautiful. He had closely studied the simple grandeur of Norman architecture, too, and was able to combine the two styles. He had lived many years in monasteries in Normandy. Life to him was very sad. He did not believe that Christian men ought to be

happy. He was always sorrowful, and when at work or at prayer, at meals, or when resting, he was so often given to tears that he was called Gundulf the Weeper.

No matter how he wept, he was a great and grand builder. He founded the Tower. He made a strong fortress for his king, who rewarded him by letting him build Rochester Cathedral and become first Bishop of Rochester.

HOW THE TOWER ROSE IN A STRANGE AND SAVAGE AGE

He built first a great watch-tower, or barbican. From this the surrounding country could be viewed, and the approach of an enemy sighted in time to prepare for defense. The old tower is now the Hall Tower, or, as it is more commonly called, the Jewel Tower. In it the king keeps his crowns and all the state jewels.

Another tower which Weeping Gundulf built was the White Tower, still to be seen in good order to-day. He was one of the greatest of the early builders, and after he died his work went on under William Rufus, who taxed the people without mercy for the work. Henry I did still more, and the people hated him bitterly for his work. They were taxed to pay for it, but they complained that it was being made big and strong, not for the defense of London, but so that the king might have a strong place in which to defy the people when he did wrong.

It was a strange and savage age when the Tower was rising to strength and size. An old writer says that the mortar in which the stones were set was mixed with the blood of beasts. Blood enough of human beings flowed in the Tower to make the blood of beasts unnecessary.

THE TEARS THAT HAVE BEEN SHED IN GUNDULF THE WEEPER'S TOWN

Most of the terrible deeds of which we read in the history of England were done in this grim old Tower. Though kings were born and lived and were married there, it was in the Tower that kings and princes, and queens and princesses, were murdered; that great and good men were imprisoned, tortured, and sometimes killed. Had Gundulf the Weeper known what a place of agony he was creating when he built the Tower, he would have wept still more, and with better reason.

BRITISH MUSEUM, THE LAW COURTS & THE TOWER



THE BRITISH MUSEUM, THE HOME OF PRECIOUS THINGS



THE LAW COURTS IN THE STRAND, LONDON



THE TOWER OF LONDON, BEGUN 1,000 YEARS AGO AND STILL STANDING BY THE THAMES
It would not be easy to find three buildings more interesting than these. The British Museum is full of valuable things belonging to every age and to every land: it speaks of the life of all the world. In looking at the Law Courts we think of it as an attractive building, but within it are heard the saddest tales of trouble and sin that can be told: this building speaks of the life of to-day. The Tower of London, if it had eyes to see, would have beheld some of the bitterest tragedies in history: it speaks of the life of the past.

THE MAN WHO BUILT ST. PAUL'S

IN the course of time, when wars with Danes and Normans were forgotten, and Saxons and Danes and Normans became one people, London grew into a big city.

But there was no order or beauty about it. Men built where they wanted or where they could. There were no fine, broad, straight roads. Though the Strand became the chief road from Westminster to the city, it was a dreadful thoroughfare. Nobles and bishops built huge palaces along its sides. It was the most fashionable road in all England. Nine bishops had palaces there at one time, and very fine some of the mansions were.

But the road itself was in a shocking state. It was full of pits, in which bad-smelling water collected. Three rapid streams rushed across the Strand to flow down into the Thames; and the Strand, which is now such a busy place for cabs and carriages and buses, was crossed by three bridges, so that people might walk over the streams without getting wet. And the people still complained not only of the pits and holes in the Strand, but of the clumps and bushes which grew there.

CHRISTOPHER WREN, THE DEAN'S SON
WHO DREAMED OF A NEW ST. PAUL'S

It was at this time that Christopher Wren was born. His birth occurred at East Knoyle, Wiltshire, in October, 1632. He was the son of the Dean of Windsor, and, on being sent to Oxford University to study, proved himself an admirable pupil. He won success in mathematics and astronomy and other sciences, and when only twenty-four years old he was made a professor of astronomy. At this time there was already a St. Paul's Cathedral in existence. There has been a church there from far back in Saxon times, but four buildings which, one after another, stood there were destroyed by fire.

Three times the cathedral was set on fire by lightning. In 1663 the building which then existed was sadly in need of repair, and they called on Christopher Wren to carry out repairs and alterations. He was glad when they did ask him, for he had longed to do the work. But he was prevented from doing it by a terrible event, the Great Fire of London. This disaster was one of the greatest blessings that have ever come upon London,

though at the time it seemed a frightful calamity. London, as Wren knew it, was a centre of filth and disease. Everywhere there were little houses of wood, crowded together in narrow streets, into which the sun could not enter nor sweet air go. There were no drains, and the water was impure. London suffered from everything which makes disease, and disease came everywhere.

THE PLAGUE THAT KILLED 100,000 PEOPLE,
AND THE FIRE THAT DESTROYED 13,000
HOUSES IN LONDON

Three times in seventy years the plague swept over the city. The third attack was the worst, for then over 100,000 people were killed by it. Still, there seemed no chance of making matters better, for the filthy streets and houses remained in the same condition. Wren's work for the cathedral could not go on while half the city was in mourning for its dead. The great plague year was 1665. On September 2, 1666, the Great Fire in London broke out.

It began in a little wooden house in Pudding Lane, near London Bridge, and spread in all directions. The wooden houses blazed like match-boxes, and the flames leaped from street to street with nothing to stop them. At one time the fire was two miles long and one mile broad. It burned 13,000 houses, 89 churches, the city gates, the public buildings, the hospitals and libraries. And St. Paul's Cathedral was among the churches destroyed.

WREN'S PLANS FOR BUILDING A NEW
AND SPLENDID LONDON

When the terror of plague and fire had died away, the people decided to begin rebuilding. Wren drew plans for a splendid city with broad thoroughfares and magnificent docks; but, unfortunately, people could not wait. They built as quickly as they could, without heeding the scheme Wren had designed. They built better houses than before, making them of brick and stone instead of wood; but they followed the old line of the streets, and so to this day there are many crooked ways.

Wren's plans were not altogether wasted, however. Many churches had been burned down, so he built more than fifty new ones, the finest churches in London to-day. He built the Royal

ST. PAUL'S, THE NOBLEST DOME IN ENGLAND



Over 250 years ago a man walked up Ludgate Hill and saw a heap of ruins at the top. They were the ruins of the old St. Paul's, burned down in the Great Fire of London in 1666. As he walked toward the great space the fire had left, this man looked up and dreamed of a beautiful dome that should rise up toward the sky. He was Christopher Wren; and to-day his dome stands high above London for all to see. In the ruins Wren found a stone with a word in Latin on it, meaning "I shall rise again." That he made the first stone of the new St. Paul's. When, after thirty-five years, the cathedral was finished, the architect was still living, to view his work; and when he died, in 1723, he was buried here under the choir. The statue in the foreground is of Queen Anne, who was ruling when St. Paul's was completed.

The Photographs in these pages are by W. S. Campbell and J. Valentine & Co.

Exchange, Temple Bar, the Royal College of Physicians, Greenwich Observatory, Chelsea Hospital, Hampton Court, Marlborough House, and he added to Westminster Abbey. But his most famous feat was the building of St. Paul's Cathedral. He made two different designs for it, and followed neither exactly.

THE STONE WHICH WAS TO RISE AGAIN, IN THE NEW ST. PAUL'S

Nearly eight years passed after the fire before the ruins of the old building were cleared away and the new work was begun. When Wren made a start, he picked out a stone from the heap of ruins, and found on it a word in Latin which means "I shall rise again." So he made that the first stone of the new cathedral. That was on June 21, 1675.

It took him thirty-five years to build the cathedral; the work was not completed until 1710. All that time, while doing many things besides, he labored at this—his greatest work. He was poorly paid, receiving only \$20 a week—less than

any good workman now receives—and even this sum he had difficulty in getting, so miserably mean and dishonest was King Charles II. A tax was placed on every bit of coal which came up the river Thames to London, solely to pay for the cathedral; but Wren could not always get his wages, though his work was difficult and dangerous. He had several times each week to get into a basket and have himself dragged up to the top of the building to see that all was being done as he wished.

In the end all was splendidly finished, and Wren was himself buried in the noble building which his genius and toil had created. There is a fine tribute to him written in Latin over the entrance to the choir, which says of Wren: "If you would behold his monument, look around you." St. Paul's, one of the world's treasures of architecture, is the monument to that great Englishman who planned the finest buildings erected in London after the Great Fire.

THE MAN WHO BUILT THE BRITISH MUSEUM

ONE of the most interesting places in the whole world, the British Museum, was built in a curious way. Its architect was Sir Robert Smirke.

Where the museum now is there had stood for a long time a nobleman's palace, called Montague House. The house and its gardens occupied a space of seven acres, as the museum does. It was a beautiful and splendid mansion, but as time passed, it needed repairs which would have cost much money, and its owner, Lord Halifax, was willing to sell it to the Government when they wanted it for a museum.

The reason why the Government wished to set up a museum was this: Sir Hans Sloane, a physician and naturalist, who was born in Ireland in 1660, devoted many years to collecting valuable books and manuscripts and other precious things. He spent \$250,000 on this collection. In his will he stated that, if the Government would pay \$100,000 to his heirs, they could have his \$250,000 collection.

Fortunately, the Government was willing. They agreed to buy that and at the same time to buy the Harleian library of manuscripts, the Cottonian manuscripts and another library.

Where were they to put all these treasures? They once thought of storing them where the House of Commons now stands, and they thought of other places, too. But no site seemed so favorable as Montague House.

So they passed an act of Parliament by which a lottery was established to raise \$500,000. Lotteries are bad things, but in those days they were not unlawful, so the British Museum was founded from money raised in this way. The sum of money necessary for the collections of books, manuscripts, pictures and other things was paid; the sum of \$50,000 went to Lord Halifax for Montague House, and a further \$65,000 was to be used for repairs.

SIR ROBERT SMIRKE, A BUILDER OF CASTLES AND THEATRES AND MUSEUMS

It was in old Montague House that the British Museum was first opened, on January 15, 1759. The building was not suitable, but it was not until 1823 that the present fine edifice was begun. This, as we have said, was the work of Sir Robert Smirke, a great architect, who was born in London on October 1, 1781. He had learned all that he could of the beauties of the buildings of Italy and Greece. He was only twenty-six when appointed to

LONDON BUILDINGS OLD AND NEW



TRAFALGAR SQUARE, THE GREAT OPEN SPACE IN THE CENTRE OF LONDON



THE HOUSES OF PARLIAMENT, THE NOBLEST BLOCK OF BUILDINGS IN ALL ENGLAND



THE COUNTY HALL AT WESTMINSTER BRIDGE, SOUTH OF THE THAMES

It is not easy to realize the majesty of London from any one place, but nowhere can one realize it better than in Trafalgar Square, which is the very heart of 100 square miles of buildings. The Houses of Parliament, with their fine towers, were finished in 1867, after designs by Sir Charles Barry. The County Hall, built in the early part of the twentieth century, was planned by Ralph Knott.

be architect to the Board of Trade, and in that year he began the Mint on Tower Hill. He built beautiful castles and theatres and other structures, but none of the other works which he planned is so famous as the museum.

HOW THE WALLS OF A TREASURE HOUSE GREW UP ROUND AN OLD PALACE

He was one of the men who could do more than one thing at a time. In the same year that he began the building of the museum, he began also the General Post Office, the famous St. Martin's-le-Grand. To make room for this building he had to pull down 131 old houses, in which nearly 1,000 people lived. When finished, this was the biggest post office in the world, but since then it has been greatly extended.

In constructing the museum, Smirke had a curious task. The collections were to remain on exhibition. So Montague House, which held them, had to be pulled down little by little, and the new building erected in its place. People read and studied day by day at the museum while one building was being slowly torn down and another slowly put up. It was extraordinary work. The grandeur of the

style made it necessary to employ bigger stones for the work than had ever been put into a building since the days of the great builders of the Roman Empire. The front of the museum is made up of 800 solid pieces of stone weighing from five to nine tons each. Sir Robert Smirke labored at this task until 1846, when the work was taken up and finished by his brother, Sydney Smirke, another gifted architect. The building cost about \$4,000,000, which is \$250,000 more than the cost of St. Paul's Cathedral.

It is a noble building, and contains the most wonderful collections in the world. Books, papers, magazines of all sorts are there. A copy of The Book of Knowledge is kept there for you to see, perhaps, when you are men and women. Manuscripts and wonderful coins, statues and bronzes from all parts of the world; mummies of people who lived thousands of years before Christ was born; toys which children had when Jacob was a boy; the cats with which Egyptian children played; the very grain that the Egyptians grew—all these, and thousands of other wonders of long ages ago, are in this great building which Sir Robert Smirke put up.

THE MAN WHO BUILT THE HOUSES OF PARLIAMENT

ONE of the strangest things about the House of Commons is that, though men are elected to attend Parliament regularly there is not room for them all to be present at once.

That is not the fault of Sir Charles Barry, the man who built the Houses of Parliament. When he drew his plans, in 1836, the country had not reformed its methods of electing members and did not send so many men to sit in Parliament, so that the house which he designed was then large enough for all.

Barry was born in London on May 23, 1795, not far from the scene of his later labors. His father was a stationer, who left him two thousand dollars. Instead of spending this on pleasure young Barry used it to pay his expenses for traveling and studying abroad. Then a gentleman engaged him to go to Egypt to sketch, at a salary of \$20 a week.

Thus Barry was able to study all the best architecture in Europe and the wonders of the ancient world, before going back to London to start in business as an architect. He began by building

small Gothic churches; but you may see some of his best work in the Royal Institution of Fine Arts, Manchester, and the Athenæum in the same city; in the King Edward VI Grammar School, Birmingham; in the Halifax Town Hall, and in private mansions and clubs in London and elsewhere.

THE PALACE THAT ROSE BY THE RIVERSIDE IN NINETEEN YEARS

The old Houses of Parliament were burned down in 1834. Sixteen months later the plans of Barry were accepted for the rebuilding. The wall along the riverside was begun in 1837, the year that Queen Victoria came to the throne, but it was not until April 27, 1840, that the first stone of the houses themselves was laid. This vast palace was not entirely completed until 1867, and its cost was about \$15,000,000.

The buildings, which cover a great area, are among the most admired in Europe. Over the royal entrance rises the stately Victoria Tower, while at the other end stands the clock tower with its chimes and the booming bell, Big Ben.

Artists love to paint pictures of the mass of buildings. Barry was a great man himself, and he got great men to help him in his work. This led to a report, after his death, that some of the best work was done, not by himself, but by those whom he had employed. Fortunately there were men living who had seen him at work

on the drawings which others were said to have done. His fame was therefore made secure.

Of Sir Charles's sons, one—an architect—had the honor of completing his father's undertakings; another was an engineer, who left as his monuments the Tower Bridge and other important works.

THE MAKERS OF TRAFALGAR SQUARE AND OF THE NATIONAL GALLERY

MANY skillful hands helped to make Trafalgar Square. In olden times kings had kept their hawks and horses there. All around were narrow, mean, dirty streets. King William IV first thought of pulling down all these old slums and of making a fine square to celebrate the victory of Nelson at Trafalgar. Sir Charles Barry designed the square, which is the finest of the sort in Europe. The idea of erecting a Nelson Column was first mentioned in 1837, but it was not until 1843 that the work was carried out. The column itself was made by William Railton, R.A., who died in 1877. The column, copied from one in a famous temple in Rome, is made of hard Devonshire granite.

FOURTEEN AT A DINNER PARTY ON THE TOP OF THE NELSON COLUMN

It is 145 feet high, and so broad at the top that, before the statue of Nelson was placed there, fourteen persons had dinner on it at one time.

The statue of Nelson, on the top of the column, was made by Edward Hodges Bailey, who was born at Bristol in 1788 and died in London in 1867. He never could learn his lessons at school, but was always drawing funny pictures of his school fellows. He became a clever sculptor, and made many beautiful statues. His figure of Nelson is seventeen feet high—about three times the height of an ordinary man. It weighs nearly eighteen tons. But, placed at such a height, it does not look gigantic.

Many years passed by before the four great lions were placed at the foot of the Nelson Column. They were done at last by Sir Edwin Landseer. He promised and promised and promised to get them done, but they were not placed in their positions until 1867—twenty-four years after the column itself was finished.

He was a little lazy over this, perhaps, but he was a noted artist and was very

careful. One day Landseer was sitting dozing in his house just after lunch when his servant entered the room and asked:

"Did you order a lion, sir?"

"A lion?" said Landseer.

"Yes, sir. There's a lion at the door in a hansom cab," answered the servant.

There at the door, in a hansom cab, the lion truly was. But it was dead. It was a fine beast, which had died of old age at the zoo, and they had sent it to the great painter of animals to study. He had it carried into his studio, and worked away for thirty-six hours until he had painted a noble picture of it. The study of that lion helped him, no doubt, in modeling the famous lions which ornament the Nelson Column.

PULLING DOWN THE KING'S STABLE TO MAKE A HOME FOR THE NATION'S PICTURES

While other work was going on in Trafalgar Square, the Government received gifts of fine pictures, so they decided to pull down what had been the old royal stables on the north side of the square and to build in its place the National Gallery, begun in 1832.

The man chosen for the work was William Wilkins, R.A. He was much hampered by the conditions. First of all, he had to carry a portico from old Carlton House, where George IV had lived, and make that part of his building. Then he had to leave open a roadway through the building which people had had when the stables were there. He had to be careful not to hide St. Martin's Church, and, finally, he was not to spend more than \$350,000, a sum the nation has since paid for one picture.

Altogether, considering how difficult were the conditions, he did very well. Wilkins was a clever architect, who built colleges and castles, and many of London's interesting buildings.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4435.

THE COUSINS OF OUR DOMESTIC HENS



The Monal.



The Argus Pheasant.



The Crested Guinea Fowl.



The Turkey displays its feathers.



Elliot's Pheasant.



Sonnerat's Gray Jungle Fowl.



The Hoatzin.



A young Hoatzin.



The Tinamou.

THE PHEASANTS AND THEIR ALLIES

HERE is a tale of much in little, a survey embracing barbarous wilds in Far Eastern lands and farm yards at home, the desert with its desperate problems, mountains mantled in snow, and the mysterious Orient with beauty resplendent like a living fable. It is the story of the pheasant tribe and its allies.

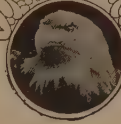
It is the Sand Grouse which leads in our present array, a group of birds few in species, but at times, in individuals, as numerous as are the sands.

We meet them in the Canary Islands; they stretch out across the warmer parts of Europe; they are in Africa; they range through Asia; they flourish in the manless wilds of Siberia and Tibet like hardy flowers; and in the great Gobi Desert, where men are unearthing dinosaurs of ten million years ago, the sand grouse are vigorous and innumerable.

The home of these birds is in the parched and pitiless desert. Travelers have told this story: while the mother guards the nestlings the male undertakes a wearisome flight night and morning to some distant oasis. There, after drinking its fill, it saturates its under-feathers with water, and flies like thought back to its nest.

The baby grouse rush to meet it as it alights, nestle their heads in the

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dripping plumage, and, squeezing each feather through their beaks, drink and drain all dry. So thirst in their young throats is satisfied, deep in the recesses of the fiercest desert. Why do not

these birds nest near a supply of water? We cannot tell, but we do know that hungry enemies of bird life are drawn to oases, and nests are probably safer at a distance which only the wings of a swift, strong bird can cover.

There is the spirit of adventure in these birds. Periodically there rises a huge tide of life in the Pallas grouse species, with their homes among the graves of the dinosaurs, half a world away. But when these tides occur the birds spread out of Asia into Europe, across the whole continent, over the North Sea, into England, and at times into every county of England. They sweep through Europe at such times, and they fly always by the same route. The migratory flights of the grouse are among the deep mysteries of nature.

There are nearly a dozen species of sand grouse, but they are all outside the true Grouse Family. In fact, naturalists now class them as nearer to the pigeons.

First we mention the Ptarmigan, a bird favored by nature. In winter its plumage is almost all white, to match

the snow of the mountains and high hills around its home. There is another suit of feathers for spring and summer, which changes to the winter coat.

This change of plumage deserves a chapter to itself, but we have only time to note that the farther north the bird goes, the more white it carries in summer. It is a bird of northern regions. Three or four species are found in Canada, but only the Willow Ptarmigan ventures into the United States.

The Blackcock is a European grouse much prized by the sportsman. The female is called the Brown Hen or the Gray Hen. The largest of all the grouse is another European bird, the Capercaillie. The sight of a male showing off before a group of females is one to be remembered. No bird makes merrier in adverse northern conditions than this high-spirited bird.

THE FATAL EPIDEMIC WHICH SWEEPS AWAY THE GROUSE

The Red Grouse, though closely related to the ptarmigans, is confined to the British Isles, where it is one of the most prized game birds. Too zealous shooting of them for a few seasons would bring about their extermination. On the other hand, too jealous a preservation of grouse by game-shooters, resulting in excessive multiplication, brings a fatal epidemic, which sweeps away the birds faster than the autumn shooting-parties.

We have several species of grouse in North America. We tell of the beautiful and interesting Ruffed Grouse and of the Canada Grouse on page 4760. The Prairie Hen, or Pinnated Grouse, a large grouse with peculiar tufts of feathers on the side of the neck was once very common in the interior of the continent. A closely allied species, the Heath Hen, is found only on the island of Martha's Vineyard, and is almost extinct. The Sharp-tailed Grouse, often called the Prairie Chicken, is seldom found south of the Canadian border, but another species, similar, except in color, is common farther south. The Sage Grouse is a large dark-colored western species, and there is also the Blue Grouse described on page 5135.

A glance shows us that there is a radical difference between grouse, heavily feathered about the legs, and partridges, whose legs are free from feathers. As a matter of fact, the partridges are allies

of the pheasants. Here is an enormous family, innumerable species in something like sixty groups, including all the partridges, pheasants, quails, ancestors of the poultry, the guinea fowls and the blustering turkeys.

How narrow is the dividing line may be seen from the fact that in our first example, the Snow-partridges, the rule of smooth legs is not invariable. In some the legs are slightly feathered, and the name of Pheasant-grouse is applied. Generally the birds range high up the Himalayas and Chinese and other Asian mountains, keeping between the snow and the loftiest limits of the verdure which feeds them, and flying over those dizzy ranges in the summer to nest in solitary Tibet.

THE WILY RED-LEGGED PARTRIDGE THAT AVOIDS THE SPORTSMAN'S GUN

Two kinds of partridge are common in Europe—the Gray and the Red-legged, or French, Partridge. The latter is a South European species which has been introduced into America and seems to be thriving. He is so acute and wary that it is difficult to get within range of him. We have no true partridge native to America, though in the North the ruffed grouse and in the South the common quail are commonly called by this name.

Partridges and quails are among the few wild creatures which thrive through bringing fields under cultivation. The simple fact is, of course, that most of the things we sow in our fields are food for them as well as for ourselves, and not in vain do we spread a banquet in sight of these birds.

They are very wise, as, settling in a field for the night, they form themselves into a circle with heads facing outward, so that danger, come it from what quarter it may, must be detected by their quick, nervous ears.

THE WOOD-PARTRIDGE THAT RUNS LIKE A RACE-HORSE

Another of the partridge groups bears the name of Francolins, birds numbering about forty species, ranging from Europe through Africa and away to India and China, some smaller than common partridges, some quite big birds. Another group keeps to the jungle, where men call them Bush Quails.

So far we have had ground-partridges, though the red-legged may at times perch in a tree; but we come next to several

species which make a habit of nesting in the branches of Asian forests; and also to the jungle species, called Wood-partridges, which rarely fly, but run like little race-horses. In this company we have partridges which develop crests of richly colored hair-like feathers above the brow.

Quails are common on both hemispheres, though ours differ from the Old World species, and some naturalists would deny the name to them. The bird has been known from early times, for we read how the famishing children of Israel fed upon them. The common European Quail migrates to Africa for the winter, but other species are permanent residents. The Rain Quail is common in India. The tiny Chinese Quail is bred for fighting, as other nations breed gamecocks. There are several other Old World species.

Our Common Quail, or Bobwhite, is fully described on page 4760. Though at first found only in the East, he has followed man to the Pacific coast. In the West are several species described under Birds of the West, and there are some species found only in the southern states. No bird is more lovable than this cheerful eater of seeds.

Deep in African and Asian forests are the bamboo partridges, in which two and even three pairs of formidable horny spurs sprout on the legs of the warlike males. Then we have an undoubted quail which is equally a kinsman of the pheasants, as wings and tail reveal, so we call it the Pheasant-quail, and find, in tracing out its family tree, that it leads us directly to the pheasants proper, with the handsome Blood-pheasant as its nearest cousin.

THE TERRIBLE ARMAMENT OF A LITTLE RED-COATED FIGHTER

Battle as well as beauty is here, for, while the gorgeous scarlet of the male should engage the affections of the female, each cock has four pairs of spurs, to enforce against other males the right to woo fair ladies of the tribe. Other pheasants show wonderful colors. A brush dipped in the rainbow would be necessary to give them their due coloring.

Though we have no native pheasants in North America, specimens of the most gorgeous are in most zoölogical gardens. Some men owning large tracts of land have introduced several species, and in some sections they are thriving. Their

size and bright colors make them easy marks for the stealthy hunter, and they must be strictly protected if they are to survive and multiply.

In the Monal, a great beauty of the Himalayan forests, all the colors flash in metallic lustre, and the flight of one of these big birds, darting out from some mountain sanctuary, and dropping, like a rainbow-tinted gem, stone-like through the air to the foot of a precipice, is a sight at which hardened travelers hold their breath in wonder and delight.

Fiery scarlet, varied with lustrous blue and ebony black, is the color-scheme of the Fire-backed Pheasants; majestic coloring marred by bare spots on the head and face all characterize the Eared Pheasants, whose name comes from the fact that the ears proper are covered with long white tracts of feathers, decidedly ear-like in suggestion. Some of the most splendid birds of the family are among the eared pheasants.

We pass next to another assembly of the mountain forests of India and China, the kalij group. Among these we find the beauties familiar to aviaries, the Gold and the Silver Pheasants. All the pheasants and their relatives are warriors, but the silver pheasant is supposed to be the fiercest of them all. It would kill one of our common pheasants as soon as look at it.

THE FAMILIAR BIRD THAT THE ROMANS INTRODUCED TO BRITAIN

What is the common pheasant of Europe of which we read? It is very hard to say. The Romans found pheasants common in Southeastern Europe, and settled them in Britain. The birds remained when the peril of the empire called the famous legions away. About a century ago travelers brought in the Ring-necked Pheasant of China, and later the Green Pheasant of Japan. These also settled down and mated with the others, so that now we cannot be sure that any bird is the true representative of the original lines. The blood of what are called native pheasants is mixed, like that of the Englishman, who is the product of half a dozen nations.

Most of these pheasants have to be hand-reared. We can never hope to acclimatize such lovely creatures as the Chinese Golden Pheasants. We have them in our aviaries, where they are hardy and thriving, but what would have been

their fate in the woods? They crown the whole tribe. The perfect radiance of gold and scarlet leads scholars to believe that the golden pheasant was the phoenix of old legends, the bird of fire which renewed itself from its own ashes.

There are many other species of pheasants which we cannot stop to mention, but must pass on to our domestic poultry. Where pheasants end poultry begin. The resemblance may not be plain, but watch a flock of healthy cockerels running uphill, with the necks craned forward and the tails drooping down, and at a distance one cannot say whether they are pheasants or poultry.

THE JUNGLE FOWL AS THE ANCESTOR OF ALL DOMESTIC POULTRY

We have here a parallel to the case of the dog, the cattle, the sheep, the pigeons. Though there is some little doubt, the bulk of testimony goes to show that we can place our hands on the red jungle fowl of India and say: "You are descended from predecessors which have given us, under the selecting hand of man, every breed of domestic poultry in the world." There are other jungle fowl to-day, as there have always been, and many students think that perhaps some of our domestic fowls are descended from the gray species. In other words, the blood of both lines has gone to make our domestic breeds of fowls.

Civilization in the East is extremely ancient, and it is believed that the taming of jungle fowls into domestic poultry dates back thousands of years. Pictures of jungle fowl have been found in the tomb of Tutankhamen, which shows that the Egyptians had received the bird in the way of commerce from the Far East, thirty centuries before poultry was a commonplace of Grecian farm yards.

WHY A HEN LAYS THREE HUNDRED EGGS IN A YEAR

The instinct of a hen is to lay, perhaps, a dozen eggs, brood them, and lead off her chicks in clucking triumph. What we have done is to steal her eggs, day by day, so inciting the hens to the hopeless effort of still filling that constantly emptying nest. The more a hen could be encouraged on these lines, the more her value increased, and the more valuable became the chicks which did eventually hatch from a single dozen of her eggs. From generation after generation of such hens have come birds which rival butter-

flies and moths in the number of the eggs they lay—over three hundred eggs a year in spite of molting time.

What wonders men have achieved in the development of poultry varieties! There is the bantam, all vanity and valor; there is the great game bird, set up on spurred stilts, which will fight to the death for the love of combat; there are Japanese varieties with tails so long that the owners must perch fifteen feet high; besides the more ordinary sorts.

Though the jungle fowls are not actively migrating birds, their descendants, transformed into scores of different varieties, have been carried wherever civilization has gone. There are hundreds of millions of hens in the world to-day, outnumbering the wild species a thousand to one.

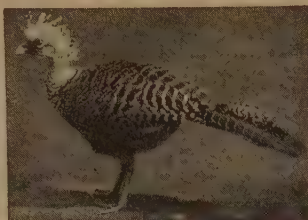
We shall not stop here to speak of the different breeds of domestic poultry. You will find many of them described and pictured, some in color, in the next chapter on Animal Life.

From the poultry we pass to more pheasants, which are on the peacock border line, and we find a celebrated beauty in the Argus Pheasant. Its elaborate plumage is starred with innumerable "eyes." We should imagine that such wealth of ornament could not be excelled if we did not immediately encounter a still more highly-decorated marvel in the Peacock itself, perhaps the supreme marvel of all India's gorgeous creatures. "Beauty is truth," sings one of our poets, and in India, where the peacock is concerned, beauty breeds superstition. The natives think it evil and dangerous to kill the peacock. The peacock, which is such a familiar sight as it struts proudly to and fro inviting admiration, is actually a native of India and Ceylon. Solomon speaks of it, and the pea-fowl was introduced to Europe a very long time ago. The gorgeous train the male bird is so fond of displaying is not made up of the tail feathers, as is usually supposed. The feathers of the train are actually a screen for the upper tail, and the true tail may be seen helping to support the train when it is spread. Africa has many natural living riches, but she cannot compare with Asia in pheasants, for the Guinea Fowl is her only child of the great race. There are several species of this bird which was kept by the Greeks and Romans but later dis-

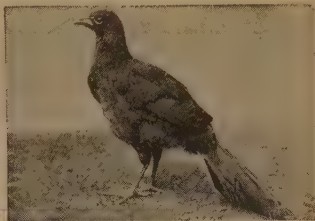
MEMBERS OF THE PHEASANT TRIBE



The Brush Turkey.



A Curassow.



The Red-tailed Guan.



The Common Turkey.



The Horned Tragopan.



The Javan Peacock.



The Silver Pheasant.



The Black-throated
Tree-partridge.



The Mongolian
Pheasant.



The Double-spurred
Francolin.

appeared from Europe until brought in again by the Portuguese. We have several varieties in captivity, but the bird has never been really tamed. It is still shy and dislikes to be too close to human habitations.

It is a desirable bird, but America has given the world one more important in the Turkey. The bird with which we are all familiar had been domesticated in Mexico long before Columbus reached the New World. It had been transported to the West Indies, too, and there the great Genoese found it and brought home live examples to show that he really had touched new land. Since then it has been carried far and wide, and called turkey by the British because it came in ships which traded with Turkey; but in Spain and France called Indian fowl, in the belief that its home, America, was the India of Columbus' dreams.

Formerly the Wild Turkey was common over the greater part of the continent. It is now almost, if not quite, extinct in Canada and the more thickly settled parts of the United States, but in the South and West some still remain in the wilder regions. By selection several distinct breeds of domesticated turkeys have been developed. The American Bronze is supposed to have come from crossing domesticated turkeys with wild specimens and is the largest of all.

No land but America produced a true turkey, but there are rather similar birds, the Brush Turkeys, in the Australian regions and elsewhere. Bodily they resemble the true turkey, but Australia has one hideous example, whose head is bare like a vulture's.

THE NATURAL INCUBATORS IN WHICH THE TURKEYS PLACE THEIR EGGS

Some species have the extraordinary habit of scratching huge mounds of rotting vegetation and leaving their eggs in them, to be incubated by the heat of the decomposing mass. Some are said to place their eggs in mounds of earth warmed by the hot waters of subterranean streams. In any event there is not the slightest care for the young.

Many eggs are laid in such an incubator, all placed with the narrow end downward so that the chick, when hatching, is head uppermost. As soon as the eggs are broken, the little ones wriggle out of the mound, and run for their lives to hiding in the bush, uncherished, unsought,

but not unguarded. Nature is their nurse, and all is well.

South America gives us the Curassows and the Guans, and a bird in some respects the most primitive of all, the Hoatzin. The young are born with great claws to those parts of the wing corresponding with the thumb and first finger of a human hand. With these claws, aided by the beak and feet, the little creatures crawl like ungainly lizards about the branches of the riverside tree in which they have been cradled.

At the least alarm the naked adventurers throw themselves into the water, swim to hiding, and, when all is apparently safe again, crawl from the water and back to their nest. If we try to imagine a baby sparrow or a baby eagle leaping from its nest to swim in deep water, and then ascend again to its nest, we see how astonishing is the feat accomplished in these ungainly wonders of the wilds.

Next we find the Tinamous of South America. Ranging in size from the partridge to the common pheasant, they resemble the game birds in general, but have points of structure clearly suggesting relationship to the towering ostrich. For perhaps uncounted years they have had the freedom of the grassy plains of South America, and have found running as effective as flight; so they run much more than they fly.

We know they were better airmen in past days from the fact that young tinamous, bringing into the world a fresh heritage of force, fly with greater zest and facility than do the old birds. With maturity comes increasing indolence of wing, greater aptitude for walking. The result is that, as men increase, tinamous decrease.

THE BEAUTIFUL EGGS OF THE TINAMOU OF SOUTH AMERICA

If we lose the tinamous we shall sacrifice the master creators of beauty in the world of eggs. What purpose is wrought in the superb sheen of a bird's egg none can say, but tinamou eggs are the marvel of their kind. Each egg is a masterpiece of enamel and tinting. Varying in size and hue, the eggs are all enameled like a lovely piece of porcelain. The wise craftsman of China, who gave us that precious ware, produced nothing more perfect and exquisite than these shells.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 4491.

BEAUTIFUL BIRDS OF THE WORLD (II)



1. Blue-crowned Motmot. 2. Bullock's Oriole. 3. Leadbeater's Cockatoo. 4. Racquet-tailed Motmot.
5. Short-billed Minivet. 6. Peacock. 7. Gold-fronted Green Bulbul. 8. Downy Woodpecker. 9.
Groove-billed Barbet. 10. Duvaucel's Trogon. 11. Red-winged Wren. 12. Black-lored Red Tanager.
13. African Pigmy Goose. 14. Canvasback Duck.



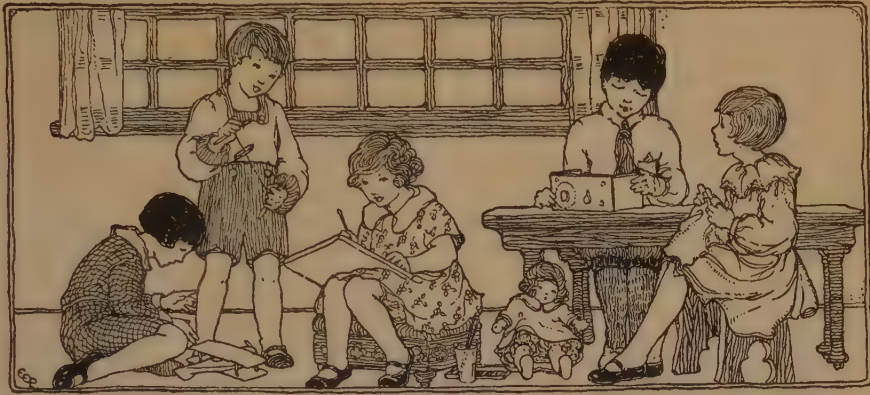
1. King Eider Duck. 2. Cardinal Honeysucker. 3. American Wood Duck. 4. Green Magpie. 5. Roseate Spoonbill. 6. Blue Jay. 7. Yellow Warbler. 8. Indian Fairy Bluebird. 9. Jambu Fruit Pigeon. 10. Livingstone's Turaco. 11. American Goldfinch. 12. Red-breasted Goose. 13. Crimson Fruit Crow. 14. African Double-collared Sun Bird.



1. Virginia Rail. 2. Flamingo. 3. Mandarin Duck. 4. Red Siskin. 5. Golden Pheasant. 6. Lady Amherst's Pheasant. 7. Orange-headed Manakin. 8. Blue-headed Warbler. 9. Orange Fruit Pigeon. 10. Saddle-billed Stork. 11. Red Chatterer. 12. Small Racquet-tailed Kingfisher. 13. African Wood Ibis. 14. California Mountain Quail. 15. Blackcap Titmouse.



1. Senegal Kingfisher. 2. King Bird of Paradise. 3. Long-tailed Roller. 4. South African Crowned Crane. 5. Scarlet Ibis. 6. Bengal Florican. 7. Black-headed Grosbeak. 8. American House Finch. 9. Blue Grosbeak. 10. Paradise Tanager. 11. Indian Black-naped Flycatcher. 12. Varied Thrush. 13. Hunstein's Bird of Paradise. 14. Lazuli Bunting.



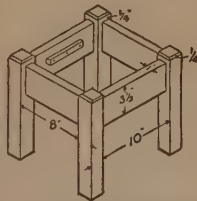
HOW TO MAKE AND UPHOLSTER A PIECE OF FURNITURE

HAVE you ever tried to upholster a piece of furniture? Furniture is upholstered not alone for the artistic effect, but also for the additional comfort which it provides. It is desirable that every person should have some knowledge of how furniture is upholstered, and perhaps the best way to acquire this information is actually to do some simple upholstering.

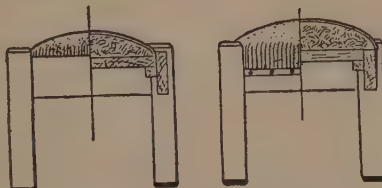
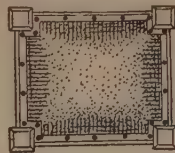
Although the methods employed in this particular problem of upholstering may be applied to other pieces of furniture, a simple stool has been chosen in order that the directions may be as specific as possible. The general dimensions of a footstool, with the exception of the height, are indicated in picture 1. The height has intentionally been omitted because this dimension should be determined by the place for which the stool is designed. Of course any of these dimensions may be modified to suit the general purpose for which the stool is to be used.

The materials needed in the construction of this stool are as follows: For the legs and rails, oak, walnut or other suitable hard wood should be used; and some soft wood, such as white pine, can be used for the top and the cleats. Instead of a wooden top, which is sometimes chosen, a webbing can be used. In upholstering, sea moss or curled hair may be

CONTINUED FROM 4268



1. Frame construction for footstool.



2. Method of upholstering footstool.

used for the packing; cotton or jute for the padding; unbleached muslin or canvas for the binding; leather, imitation leather, cretonne or tapestry for the covering; and tape, gimp and upholstering tacks for the finishing. Scissors and a hammer are needed.

In planning this footstool the place where it is to be used and the weight and wear it will have to stand are factors in determining the exact size and materials which you might well use. The color of the top, woodwork, gimp and upholstering tacks should, of course, harmonize. The upholstering may be designed to extend over on the rails, or side pieces, as shown in the top view of picture 2. It may extend down on the inside of the side pieces, as shown in the front view of picture 2, or it may extend down the outside of the side pieces, as indicated in the side view of picture 2. The cushion may be made high and rounding or low and flat.

The joints may be doweled or mortised, as you may prefer.

After all of these points covering the construction of the footstool have been determined, a working drawing or sketch should be made to incorporate these. As a working drawing of the upholstering would be quite difficult to make, a sketch may be used to show your plans. The sketch



should show all dimensions which have not been shown on the working drawing of the woodwork. As all dimensions in the illustration, picture 1, show finished sizes, the stock for the legs should be squared up in one piece and cut to the finished lengths afterward, as should also the material for the sides.

Note that the tops of the legs are beveled. If this method is used, the dowels which fasten the stool together are placed two in each end of the rails, each $\frac{3}{4}$ inch from the edges. The dowels are 3 inches long with $1\frac{1}{2}$ inches extending from the side rails into the legs. If the bottom board is used as shown in picture 2, it should fit tightly, while otherwise the board should have an allowance of $\frac{1}{8}$ inch on all four sides to leave room for the muslin, covering and tacks. The top for a stool of this size will require about $\frac{1}{2}$ pound of sea moss. The cotton padding should be cut to the exact size of the finished top, while the muslin binding and top covering should be left at least 2 inches larger on all sides than the top.

In assembling the parts, these pieces should be carefully glued and clamped together and left about a day for the glue to set. The woodwork should next be cleaned and smoothed with sandpaper, and finally finished with stain and varnish. If webbing is used in the bottom instead of a board, it should then be tacked in place. In upholstering the stool, the sea moss is shaped as much as possible into a cushion-like form and placed on the top to be covered. The muslin binding should then be placed over it and tacked in place. It is better first to tack this only temporarily from corner to corner and then stretch from the centre to the centre of

both sides. This binding should be tacked securely at the centre and tacked down firmly all along the edges. Do this by working from the centre of each side toward the corners and then removing the temporary tacks as the permanent ones are placed in position. A layer of cotton is next placed over the muslin and then the top cover is placed, much after the manner in which the muslin was tacked. Gimp and ornamental tacks are used as shown in picture 2, but the corner is first fastened with ordinary 2- or 3-ounce tacks. The gimp is placed over the rough edge to hide it, and the ornamental tacks are used for decoration only.

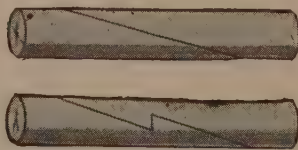
This is only one of the many methods of upholstering. However, it may be applied to other problems besides this footstool, such as upholstered chairs, window-seats, and so on. Perhaps you have observed that automobile seats, as well as furniture, are usually upholstered in some form. On account of the different methods of upholstering and the various applications of these, those who upholster automobile cushions and furniture are usually classed separately.

Each one must follow special processes which are required by his trade, but the general principles of all upholstering work are practically the same. Along with this actual upholstering, you should have become better acquainted with the harmonizing of the colors used, the values of the materials needed and the appropriateness of the design and construction involved. After upholstering this simple footstool, you should be able to undertake the re-upholstering of a chair which has been cast aside because it needs this treatment.

TWO WAYS OF SPLICING A STICK

EVERY boy, especially a Boy Scout, ought to know how to splice a stick or a pole, and as the method to be followed is quite simple there is no reason why anyone need be unable to do this very useful work. The out-of-doors girl also is interested in the best method of splicing a stick. By proper splicing, poles may be lengthened, broken sticks mended and other pieces of wood extended to any length that may be required.

The simplest method, which, however, does not give the best and strongest result, is to make a straight splice, as shown in the top picture. The two ends to be joined are cut to a sharp angle and made to fit exactly upon one another. Then, if we are handling a pole or a beam, the two portions are bolted together, while if it is a stick or a thin pole, instead of bolting the



Two ways of splicing a stick.

pieces, we glue or screw them to one another. The best method of splicing, however, and by far the strongest, is that known as the bracing-splice. It is rather more difficult than the straight splice, but the extra trouble is well

worth while, especially if there is to be much strain upon the jointed pole or stick. Instead of there being a straight, slanting cut at the end of each portion, a kind of step is cut in each piece, and the two portions then fit each other exactly, as shown in the bottom picture. They may be fastened together by having wire bound round, if the pole is a thick one, or by using glue if we are splicing a stick. If we are splicing a new piece of wood to some article, and the new wood needs shaping to match the old, the splicing should always be done first, and then the new portion can be worked to whatever shape may be required.

ANSWERS TO THE PICTURE-PUZZLE ON PAGE 4268

ON page 4268 we have a drawing of a large steamer beside a quay, and in it the artist made several mistakes. Here is a list of them.

1. There is no name on the bow.
2. The portholes open outward instead of inward, as they should open.
3. The scupper is opened the wrong way.
4. The rattlings are unfinished.
5. The numbers should read upward.

6. The foremast is leaning forward instead of backward.

7. The funnels also should lean back.

8. The waste steam pipes should be in front of the funnels.

9. The anchor-chain hole is the wrong way.

10. No ship in dock has an anchor down.

11. There are no ventilators, halyards, fore-topmast stay, or side-light board.

GAMES PLAYED WITH DOMINOES

UNLIKE chess and checkers, which are very ancient games, dominoes are not known to have been played before the eighteenth century, when they were introduced into France and Belgium from Italy, and later came into England. Dominoes are very popular here, but in no other country are they played so much to-day as in France and Belgium.

A set of dominoes usually consists of twenty-eight pieces, each divided into two parts with so many spots on each. In the north of England sets are often used that contain fifty-five dominoes, going up to the double 9, and on the Continent it is quite common to go up to the double 12.

THE BLOCK GAME

THE simplest game with dominoes is known as the Block Game. The dominoes are placed on the table face downward and shuffled. Then each player draws one, and when these are turned up, the player with the fewest spots is the one to start the game. The dominoes are now shuffled again, and each player takes seven pieces, which he looks at, but conceals from the other players.

The first player now puts a domino down, say, the 6-5, and the next player has to play a piece with a 6 or a 5 on it. This he places against the corresponding number, and the next player's turn comes. If the second player puts down a 6-3, then the third player would play to a 5 or a 3. Thus the play goes on until a player has used all his pieces, when he wins the game. If there comes a deadlock, and no player can match the numbers that are up, then all the outstanding pieces of the players must be turned up, and he wins who has the fewest spots.

THE DRAWING GAME

THIS game is played in exactly the same way as the block game, except that when a player cannot go, instead of passing he must draw from the unused stock of dominoes until he is able to play. Two dominoes, however, must always be left face downward on the table and not drawn. In both the games described it is always best to play the high pieces, such as double 6, 6-5, double 5, and so on, first, so that if in the end no one can go, we may have as few spots left as possible.

FIVES AND THREES

ANOTHER interesting and exciting game with dominoes is called Fives and Threes. The pieces are shuffled and drawn as before, but the game is not to get out first, but to make as many 5's and 3's as possible. For instance, the first player puts down the 5-4. This makes 9, or three 3's. He scores 3 points. The next player must play to 5 or 4, but he must try to make the outside numbers add up to multiply by 3 or 5. He plays, say, a 4-1 to the 4, and the outside added to 5 makes 6, or two 3's. He scores 2. The next player plays to 5 or 1. He puts down the 5-1 not to the 5 end, but to the 1, and the outside 5 added makes 10, or two 5's; score 2. Now, suppose the next player has

the double 5; he puts it down crosswise, and both sections of the domino count—that is, 10 is added to 5 at the other end, making 15. But 15 is not only five 3's, it is also three 5's and so 15 up scores 8 points. Only one other combination will give 15, and that is 3 at one end and double 6 at the other. Double dominoes are always placed crosswise on the line and the spots on both sections are counted. This is one of the best possible games with dominoes. It is always dangerous to start the game with double 6, in case the next player may have the 6-3 and score 8 points.

Two, three or four players can play at this game, and the number of points to be played up—usually 31 or 61—is always decided beforehand by the players.

THE GAME OF MATADOR

MATADOR is one of the most scientific and interesting forms of the game of dominoes. It calls for concentration as well as a good memory. A skillful player knows what the next moves will be as soon as a certain number of dominoes are played out. In this respect it is like chess.

In this game, instead of matching a number, we have to place down a domino so as to make up the number 7. Thus, if the first player has played the 5-2, we must play a piece with a 2 or a 5 on it, so as to make a 7 with one end of the first domino. Suppose the second player puts down a 2-6, the end numbers are now 6 and 2, and the next player must put down either a 1 or a 5 to make up 7. When a domino is played that makes a blank at the end, this blocks that end, and only a matador domino can be played there.

There are four matador dominoes, the double blank, and the three pieces that have 7 spots upon them, namely, the 6-1, the 5-2, and the 4-3. A matador may be played to any number, even if one of its squares does not make up 7 with the last piece played, but the piece played to a matador must make 7 in the ordinary way.

As a matador may be played to any number, it is wise to keep our matadors in reserve for a difficulty. In playing this game each player takes seven pieces, but when we cannot go, we must draw from the reserve, as in the drawing game.

All these games of dominoes may be played by two, three or four people, and four may play either as individuals or as partners.

OTHER GAMES

THERE are, of course, variations of these games which are sometimes played. For instance, matador can be played by using 5 or some other number as matador. If 5 were taken as matador, then the matador pieces would be 5-blank, 4-1, 3-2, and the double blank; if 6 were matador, then 6-blank, 5-1, 4-2, and 3-3, and double blank would be matador pieces—that is, there would be five instead of four such pieces. Similarly, the game of Fives and Threes can be adapted to Twos and Fives or Fours and Fives, but experience has proved Fives and Threes to be the best and most interesting combination.

THINGS TO DO IN AWKWARD SITUATIONS

WITH HINTS FOR BOY SCOUTS

IT is essential for any boy who wishes to become successful in life that he be full of resource, and able to adapt himself to every circumstance in which he is likely to be found. Such resourcefulness is needed not only in boy scouts, but in every boy who does not belong to any organized body of scouts. There are many things that a boy may do when out for a day in the country that will fit him for real scouting and camping work, should the need for such work arise.

TO CARRY WATER

There are various ways of conveying water from one place to another when we have no pails or proper vessels for the purpose. Canvas bags smeared with grease on the outside are quite waterproof after they have been soaked for a short time. A basket with oilcloth arranged inside makes a useful bucket, and if an old coconut shell is handy, it may be used for holding water. It is worth remembering that if we are carrying water in pails, some grass picked and placed on the water prevents it from splashing. A hole in a leaky vessel may be stopped temporarily with rag or grass well greased over.

TO LIGHT A FIRE

In these days of cheap sulphur matches, there is rarely any need for us to "make fire" when we want to light a fire of wood. But even with matches it sometimes happens that a whole boxful may be wasted on a windy day before the fire can be lighted. It is useful, therefore, to put an overcoat or cloak over our head and over the piled-up wood before we strike the matches, and then, if we have taken the precaution to gather plenty of dried grass and small twigs, we shall have no difficulty in lighting our fire. Wax matches are much better for outdoor use than wooden ones, as the latter get damp in wet weather if they are exposed to the air for long. If we have nothing dry to rub the match upon, we may ignite it by scratching the head of it with the blade of our penknife.

FUEL FOR FIRE

It may not always be easy to get wood for fuel, and it is worth knowing that there are various other substances that travelers use in its place. Bones of animals are very useful for this purpose, particularly if fresh; but even the bones of cooked meat, if added to a fire, will burn well. The dry manure of cattle, as found upon the ground, is also very useful, and is not at all disagreeable as fuel. If nothing better offers, dried seaweed will burn with great heat, although it does not make a fine cheerful fire. If large logs are being used for fire, two or three of them should be arranged as shown in

the picture, the dark ends being the part in the fire. As they burn away they are pushed forward, and so are burned according to a regular system.

TO REST IN A GALE

To lie down and rest in the open air when a gale of wind is blowing, we must not make the mistake of getting under a tree, which provides a good roof high up, but has no wall. What we need is a wall, and a wall about 18 inches in height will be quite high enough.

This may be provided by turning up the turf if we have a spade, or by piling up stones, or perhaps we may find a little hollow with a natural sheltering wall. In a heavy gale there is always a violent eddy in the neighborhood of a tree, and the result may be seen in a corn-field after a storm, where the corn in the open is unharmed, but that near the tree is all beaten down. It is always warmer to lie down under a cloudy sky than under a clear sky, for the clouds act as a blanket. On sandy plains travelers often keep themselves warm when sleeping at night by burying all but their heads in the sand. The same plan is followed in snowy lands, the snow making a really warm covering and protection from the cold air.

A SIMPLE MATTRESS

When resting or sleeping in the open air it is as necessary to have something to lie upon as to have proper covering for the body, otherwise the part of the body that is in contact with the earth may get chilled. All kinds of things will provide a useful mattress, and in this matter we may imitate the bird in making its nest. Dried grass, leaves, feathers, heather, wood-shavings, bundles of faggots, newspapers, and similar material can be used with advantage, and if the ground is really wet, an excellent bedstead can be made from a heap of stones or a couple of tree-trunks rolled together, if such are available.

SEATS FOR A MEAL

If we are going to make a stay in one place for any length of time and have no furniture, it is a good plan to dig a trench. This provides both chairs and table, for we can sit on one side of the trench with our feet and legs in the hole, and the other side of the trench makes a handy table. In this way we have a much more comfortable seat than we otherwise should have if we just sat about on the ground or on any odd log that happened to be about.

If we are not staying long enough in any place for it to be advisable to dig a trench, we can gather up any dry litter that may be lying about and sit on that.



The right way to make a log fire.

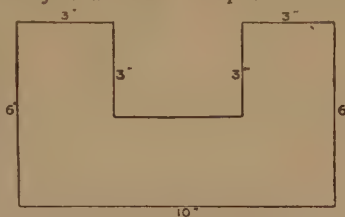
HOW TO SEE THROUGH A BRICK

ONE sometimes hears the expression, "I can see as far through a brick wall as anybody else." We shall learn in this article how to make a clever little toy that will

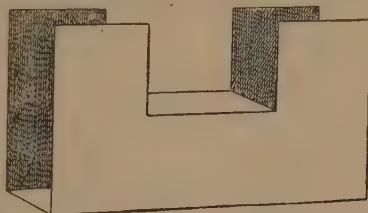
enable us to see through a brick, or a book, or a slate, or anything else that is not too large, so that if we hear the expression again, we can tell the speaker that we can teach him how to see quite easily through a brick. We need some pieces of wood—ten in all—about $\frac{1}{4}$ inch thick and of different sizes. We should see, when we join the pieces of wood together, that all the joints are light-tight—that is to say, that they admit no light. If we do so, the result will be better than it would be if we neglected this point. We cut out two pieces the shape of picture 1, and of the sizes marked in picture 1; then one piece 10 inches long and 4 inches wide, and another piece 4 inches square. We nail or glue these four pieces together as seen in picture 2. Now we make and add an upright piece at both ends of the square piece; this will require two pieces of wood 4 inches long and $2\frac{3}{4}$ inches wide. Then we make two pieces for the top of

from the bottom of the box. This is shown in pictures 3 and 4. Now we get two pieces of wood 4 inches long and $3\frac{1}{4}$ inches high, which we put on at each end behind the backs of the lower pieces of mirror. Our toy is now complete, as seen in picture 5; but if we paste colored paper over it right around outside, it will improve its appearance and also help to make it light-proof at the joints. If we place a brick, or a book, or anything else of a suitable size on the platform in the middle part of our box, we shall find that, on

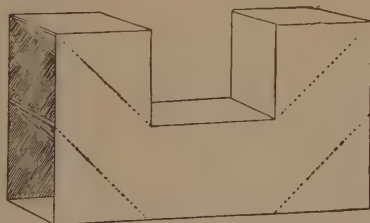
looking in the opening at one end of the box, we can apparently see right through the brick or book. The effect will be more striking if we have a light—say, a window or a candle—opposite the other aperture. Then the light will seem to shine right through the solid brick or the book when we look into the other aperture. The mystery of how this comes about is made clear in picture 6, which shows what happens inside the wonderful box. If we follow the dotted line from the eye through the box and out at the far aperture we can understand how we can see through the brick. The mirrors



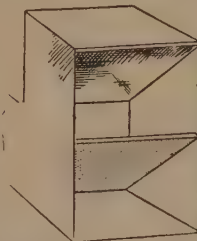
1. Side of the box cut to shape.



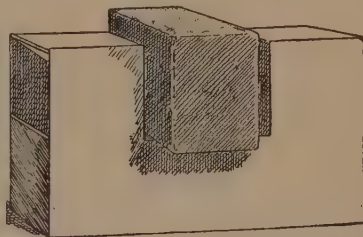
2. Box with bottom and platform.



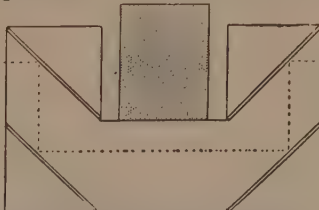
3. Box after the mirrors are fitted.



4. End, showing mirrors. 5. Completed box, with brick in place.



the box; these will be 4 inches long and $3\frac{1}{4}$ inches wide. When they have been added to the box, it will be as seen in picture 3. Now we must get four pieces of looking-glass all the same size, 4 inches long and $3\frac{1}{2}$ inches wide. We fit one piece across the inside corner of the box at one end as seen in picture 4. This must be put in face outward and at an angle of 45 degrees with the top of the box—that is to say, the two side edges of the glass will be at equal distances from the corner. Now fit another piece of mirror in the similar corner at the other end of the box. We fit the other two pieces of looking-glass, backs outward, at the bottom of the box at each end and at an angle of 45 degrees



6. Diagram showing the line of vision.

enable us to see not precisely through a brick, but rather around the brick; but the effect is exactly the same as if we saw through the brick. The whole secret is explained by the words "multiple reflection," which mean that the reflection of the image is thrown from one reflecting surface, or mirror, to another reflecting surface. Good results are obtained only when the mirrors are placed exactly at the proper angles. Therefore care must be given to the angles at which the mirrors are fixed when the toy is being manufactured. We can find the proper angles by experimenting. If we can persuade a friend to help, it will be much easier and quicker.

HOW TREES ARE MADE TO SERVE US

IS it because trees are so common in most communities that we assume that we know a great deal about them and their uses? As a matter of fact, trees now serve us in many more ways than most persons have come to know. We are all well aware that living trees are set up and down the streets, wherever possible, both for their shade and their beauty.

Sometimes we see rows of evergreens set close together to make a protecting wall. At other times we observe low-clipped hedges which make attractive boundaries. On lawns and near houses different kinds of trees are often planted for their beauty as well as for their shade. Then, too, orchards of fruit trees are set out because they furnish desired food. Nut orchards are sometimes planted for this same reason.

The trees which are cut down in the woods and sawed at the mills give us lumber to build houses in which to live, and also to construct furniture to make us comfortable. The same forest furnishes the fuel that keeps us warm.

It is necessary both to travel and to read if one is to learn just how the peoples of other countries make use of their trees. The basswood, which nobody cares to use except for fuel in some parts of this country, might appear to have few uses when compared with those trees whose wood is harder and stronger. However, in some of the older countries one finds quite a different opinion of this tree. In Russia, for example, its tough bark is used to make the shoes of peasants. Ropes, fishing-nets and braided mats are made from this tree's fibres, which are very long and tough. The seeds are in some countries made to yield oil that is believed to be quite as good as olive oil both for cooking and for table use. Perfume is likewise extracted from the flowers in some countries. Cattle also browse on the twigs and leaves in others. Then this wood is considered good for the wood carver's work, because it is soft, white, free from knots and other imperfections. It is used especially for bureau drawers, carriage bodies, barrel staves and paper pulp. Even its twigs are used to make artists' charcoal pencils.

Linden trees, as they are called, are planted for shade in many countries, and in Europe they are sometimes cut into grotesque shapes of certain animals as they grow. They are clipped into hedges which are as close as box or yew trees. In America, of course, they are usually allowed to grow naturally as shade trees. European species are found to be much more symmetrical than our native kinds.

The Indians of the Northwest, who are known as Alaskans, have used the soft inner bark of the tamarack pine for food. They cut down the trees, stripped them of their bark, and scraped out this soft lining layer. With water they mashed it into a pulp, which they cooked and then molded into large cakes. A hole was next dug in the ground, lined with stones, and a fire was built in it. When the stones were hot all ashes were removed, and the cakes, wrapped in green skunk-cabbage leaves, were laid in. A fire of damp moss was built on top, and thus the cakes were thoroughly baked. To insure

their keeping, they were next smoked in a close tent for a week or more. This dried and cured them so that they might be safely packed away for future use. These hard, dry cakes were afterward broken into pieces and boiled. When the mass softened and cooled it was ready to eat. The fat of different animals was, and still is, used for butter on this strange Alaskan bread.

We have observed that trees bear fruits of many kinds that have long since been useful as food for men and beasts. Spices, such as nutmegs, mace, cloves and allspice, may be added to this list of fruits which are used as food by man alone.

The bark of birches is considered invaluable by the Indians, who still make canoes, baskets and different kinds of utensils. Huts and teepees are sometimes walled with it. Rope and coarse cloth are made out of the fibre of mulberry bark, and berry baskets are made out of the bark of the lodgepole pine. The fibrous roots of the larch tree furnished tough thread, with which the Indians sewed canoes of birch. Then too they made these water-tight with the gum of the balsam. The brown gum that can be made to ooze from the western larch, which is sweet and starchy, was discovered by the Indians to be a valuable food.

One of the most recent uses of wood by man is the making of paper, although of course the white hornet had previously shown in its conical paper nest that this could be done. She has been making this wooden paper for hundreds of years, scraping the wood from weather-worn boards and from dead limbs of trees. At the present time our newspapers are made of ground wood, cooked to a soft pulp and rolled out into thin sheets. The high price of paper makes it worth while to gather up papers, bleach them, convert them into pulp, and roll them out again into sheets. Spruce wood and poplar are among the cheap woods which have come into demand at the paper-mills. The forests of these trees, counted of little use for lumber, and therefore considered waste, have become valuable because these paper-mills can now use them.

If you look about the room, you will see many things, including furniture, which are either products of wood or at least owe some debt to trees. That paint which covers the window-frames and the like was mixed with turpentine obtained from the pitchy sap of pine trees. Then the shades, curtains and other furnishings are colored with dyes of many kinds, which are extracted from the various dyewoods or trees that grow in tropical forests. The newspapers and the books, as has been pointed out, are made of wood-pulp. The lacquered box or other attractive container was made possible because the lacquer varnish is the sap of an Oriental sumac tree. If this is a Japanese box, the perfume is made from the fragrant gum of the Oriental sweet-gum tree.

The fine skins out of which gloves and other similar leather goods are made are tanned with the acorn cups, or galls, of a European oak. Other heavier skins such as those used for the shoes you wear are made of leather tanned

with bark. Native woods, principally hemlock trees, are stripped of their bark by men known as peelers in early spring. Other trees, such as black oak and chestnut oak, are also stripped of their bark. Carloads of bark taken from our trees are shipped to the tanneries to be used in the tanning of skins, so that these may be converted into leather. Perhaps you did not know that the kind of leather determines the method by which it is tanned. Beautiful books are sometimes bound in Russia leather. The acorn cups of a European oak are used to tan the skins that make this leather so much more beautiful than that used in making your shoes.

Gloves are often made of kidskins which are tanned in Europe. For this particular work the nut-like galls that grow on certain oak trees are gathered in the woods. Tannin is the substance in oak-bark which makes it valuable in tanning leather. A high percentage of tannin is found in oak-galls. For this reason they are gathered in many countries, and are among the most valuable and high-priced supplies for the establishments that tan skins for gloves. The most expensive inks and dyes are those that do not fade. Those which are considered practically permanent are made from these selected oak-galls.

Oak-apples are a strange fruit, found in more or less abundance on the leaves of our own oak trees in autumn. You have probably seen them on the leaves in the summer-time. They are plump, green balls, which are somewhat larger than a walnut but of globular shape. In the autumn these balls take on the color of the dying leaves. These same trees may have hard little marble-like balls growing on the twigs. These are of different sizes; and it is not uncommon to find holes in both sides.

All such outgrowths on the leaves and twigs of oaks are called galls. They are chiefly caused by winged insects called gall-gnats. An egg is laid in the early spring in a slit pierced in the twig or leaf. As this egg hatches, the tissue about it is disturbed in its growth by the presence of this feeding grub. The soft leaf pulp, or the tender tissue of the twig, that surrounds it is the food which the grub prefers to eat. Food and drink are all about it, and as it feeds it grows. The leaf swells, and so the grub is surrounded with an abnormal growth. The grub still feeds, and the swelling becomes larger and larger, until, finally, when the insect ceases to eat, it is housed in the peculiar ball which we know as an oak-gall. Each species of gall-maker is known by its particular house.

The oak-apples referred to are of several kinds. Some are empty except for a little shell in the centre, in which the fat grub sleeps. Sometimes the substance within the "apple" is corky and sometimes it is spongy. Bullet galls, which form on the twigs, are usually solid to the centre, where the grub lies until the time comes for it to bore its way out to the surface and fly away. It then lays eggs which will produce other galls. Usually oak-galls, which are found during the winter, contain the sleeping grub, whose transformation into a winged insect waits until the coming of spring.

The corks found in your ink and other bottles were made from the bark of an oak tree. If you were to go to Portugal or to Northern Africa, you would see the cork harvest in

progress during the months of July and August. There is no place to go for genuine cork except to a small evergreen oak that rarely reaches a height over thirty feet. When these trees are twenty-five years old a hard, thin layer of bark is stripped off. This is a valuable tan bark, but it is not in the least corky. The tree now produces a spongy bark entirely different from the first bark renewed. It is then left undisturbed for eight or ten years. Then this is stripped off. This is the poor quality of bark on which fishermen sometimes float their nets.

About ten years later the bark is again stripped off. It is now much better in quality than the first. Each ten years brings the bark-stripper to remove the bark from the tree. In the fiftieth year the bark is of the very finest quality, and for the fifty years that follow there are five strippings of bark of the highest grade. Then the quality seems to become poorer and poorer. The trees are then cut down, the bark is sold to the tanners, and the wood is used either for charcoal or for fuel.

It is a very particular job to remove the cork and to leave the under layer uninjured. The trunk is stripped from the ground to the point where it branches, and the inner, or "mother bark," must not be bruised, for no more cork will grow on a bruised spot. Two circular cuts are usually made—one at the top and one at the bottom of the trunk. Then two opposite slits are made to divide the bark of the trunk into two halves. These curved sheets are worked off by inserting a wedge-shaped tool between the bark and the trunk, and gradually working it further in until the whole curved sheet is removed. These two big sheets are first steamed and flattened, then bound in bundles, and finally shipped to the wholesale dealers in cork. The owner of a grove of cork oaks must wait about ten years between the crops of bark; however, every year produces three crops of acorns on these trees. The pigs of the owner, which are usually turned into the grove, are fattened on this rich food. Consequently these small trees are profitable in two ways.

In Southern Europe, where the evergreen holm oak grows wild, is found one of the most valuable ornamental oaks which as a fruit tree has unusual value. Its acorns are sweet and rich, and the crop is unusually heavy. Hogs likewise are fattened upon these. In the earlier days it is reported that these were used as human food. Even now gipsies are said to gather them to eat. In any case its acorn cups, bark and galls are of the very best quality. They are always used in the most particular jobs of dyeing and tanning. This tree has still another use. Under the ground some holm oaks bear a strange fruit; it is a fungus known as "truffle," which develops on the roots. These truffles are somewhat similar to mushrooms in their growth. They are even more delicious to eat, as well as more expensive to buy, than our mushrooms. The best truffles are now found in France. French people are reported to be especially fond of them. The trees that grow on chalky lands are much more likely to produce these truffles. At about twelve years of age this oak begins to yield, and the truffles may be found upon their roots for about twenty-five years. However, as already pointed out, not every holm oak has truffles on its roots.

HOW TO MAKE A DAINTY BLOTTER

A DURABLE and neat blotter which will hold notepaper and envelopes, and has a cover that can be taken off, washed and put on again, is a useful thing to possess. The one described here is easy to make and quite inexpensive.

The materials required are: two pieces of stiff cardboard to form the two halves of the cover, a strip of calico to bind them together, some crash or colored linen to cover the cardboard, a fine cord to sew round the edge of the cover, and a skein of embroidery floss or mercerized cotton for working initials or a pretty design on the cover.

A crash material 36 inches wide, and costing about 25 cents a yard, is frequently used for making blotters, because it is substantial, washes well, and, being of a canvas texture, may be readily embroidered. A suitable cotton cord costs very little, and a silk one can be got at about 5 cents a yard.

The blotter can, of course, be made any size we prefer. For a large one measuring 12 inches by 9 inches, $\frac{1}{2}$ yard of crash would be ample. The two cards—a good white cardboard is best—should be cut quite within these measurements, and should be exactly the same size with smooth, neat edges. The strip of calico should be about $1\frac{1}{4}$ inches wide and longer than the card covers. These are placed side by side face downward, about $\frac{3}{8}$ inch apart, and the strip of calico is then stuck on the adjoining edges with liquid glue or a strong gum. Care must be taken not to let the pieces of card touch, for if they do so the blotter will not open and shut easily. The ends of the calico are doubled over and stuck on neatly, as we can see in picture 1.

When the card foundation is made it is put aside to dry, and while it is drying we can set about cutting out the cover pattern from the material chosen.

If the material permits, the outside and the two pockets for the inside may be cut all in one long strip of 36 inches, just the width of the crash material, 18 inches forming the back and front, and 9 inches each for the inner pockets. The picture shows how the pockets inside are made. A broad hem prevents their openings from fraying, and their sides are run up on the wrong side. Before running them up,

it is advisable to test the fit of the cardboard foundation which is to be slipped into them. And if we intend to embroider the front cover in any way, now is the time to do it, as it is so much easier to handle it before the pockets are sewn.

Picture 2 shows a design for the cover outlined in deep pink embroidery floss. If we cannot draw the monogram, we can buy little model card letters at 2 cents each and work these on to the material with satin stitch. A pattern can be transferred in the way described on page 336.

Having made the pockets we next stitch the cord round the edge of the cover, choosing for its color a pretty pink or perhaps a blue to match the embroidery on the outside.

Before placing the card foundation in the cover we must cut out three sheets of blotting-paper, fold them to the size of the blotter, and stitch them on to the calico strip in the same way that pages of an exercise-book are stitched on to the cover.

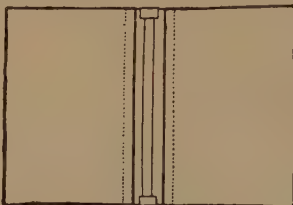
Now we can slip the two cards into the two pockets of the cover, and our blotter is ready for use.

If we are thinking of giving our blotter as a present to a relation or friend, we could of course make it look prettier and daintier by working a more elaborate design, or, better still, quite charming covers could be made of brocade or thick corded old rose or green silk, although this works out a little more expensive.

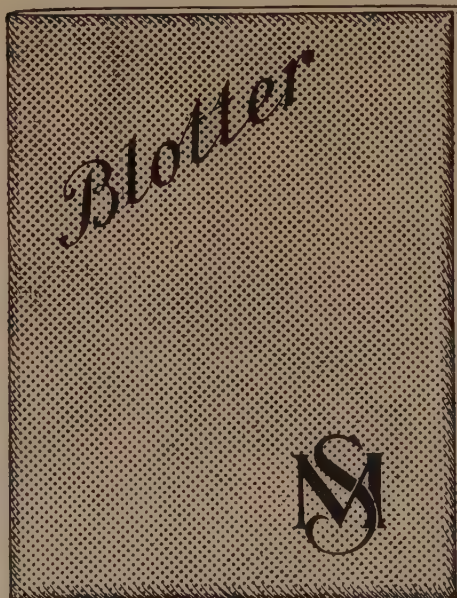
Should there be enough material left, a good idea would be to make a cover in exactly the same way for a telephone book or a time-table. The paper covers are slipped into the pockets, and a fine cord is passed round the back of the cover and halfway through the book to keep it securely in the cover. A suitable design for this would be a railway signal-post and arm bearing the title of

the book, or we might have the name Telephone Directory worked in a contrasting color up the back of the cover or slantwise on the front.

The best plan is either to write the letters ourselves in pencil, or to get someone who writes a nice flowing hand to do so for us, and then embroider over the pencil. If printing is one of our good points, we may prefer to print the letters, or we may stencil them. We can get nice effects by both methods.



1. The foundation.



2. Design for the cover.



The locust tree, or false acacia, and its flowers and a leaf.

THE BEAUTY TREES

ALL of you know how beautiful trees are and how much they add to a landscape. Here we shall describe some of the more familiar of the trees grown in parks and gardens for the beauty of their form or foliage or blossom. And it must always be remembered that some of our common fruit trees in blossom are quite as beautiful as many of the trees which are grown because of their flowers. No laburnum or lilac can ever look more beautiful than an apple or a plum or a quince tree in full blossom.

Many of the trees prized for timber are exceedingly beautiful, and might well find a place here. The stately grandeur of the elm, the dainty loveliness of the birch, and the drooping gracefulness of the willow would give them a high place among trees for beauty, to say nothing of the maples.

Perhaps pride of place must be given to the Horse-chestnut. A single tree growing where it has plenty of light and air around it, with free scope to develop as it will, becomes a very lovely object, "in all the richness of its heavy velvet drapery, embroidered over with millions of silver flowers." Massed together the foliage and blossoms of the horse-chestnut are very striking, and they are quite as interesting when examined closely. The true horse-chestnut is a native of the moun-

CONTINUED FROM 4260



tains of Greece, Persia and India, but it has grown wild in America for a long time, and we may certainly reckon it among our wild trees. It grows fifty or sixty feet high, with an erect trunk. Unless

it is too much crowded, it develops into a stately and symmetrical pyramid. If we look at the tree in winter, when the leaves are gone, we shall be struck by the strength and massiveness of the branches. This is a clear indication that they are intended to bear a heavy mass of leaves and blossom. The buds, even in January, are very large, and, as spring approaches and the sun becomes stronger, the buds suddenly burst, and the delicate green leaves seem to open out as if by magic.

There is no better plant in which to study the unfolding of the leaves than the horse-chestnut. We can easily see the overlapping scales in any bud at the end of a shoot; and if we carefully remove these one after another, we shall see how they are seated in the bud. Care is needed for this, as the bud is sticky. A gummy substance helps to hold the scales together and keep out water. When the brown scales are removed, we find thin chaff-like ones, and then come scales covered with woolly hairs, green in color and shaped like miniature leaves. The long woolly hairs are folded round like a scarf, and prevent too much loss of

water from the tender leaves when the buds open in the spring. If we cut a bud clean through the centre we shall see how closely all the scales fit together. They become smaller and smaller nearer the centre, where the tender end of the stem is. On the sides of the shoots are several large buds, which, if examined, often prove to be the same inside as the terminal bud which we have already opened. Some buds contain leaves and flowers; others (the smaller ones) contain only leaves.

The flower-buds are just as wonderfully packed. A German naturalist took a bud the size of a pea from a horse-chestnut, and found that the external covering consisted of seventeen scales well cemented together by the gummy substance. Then came the down, or woolly hairs, and inside four leaves surrounding a spike of flowers. With the aid of a microscope he counted sixty-eight flowers, and was able to distinguish the pollen.

THE COMMON ERROR ABOUT TWO CHESTNUT TREES

After they have opened, leaves and flower-buds continue to grow, and by the end of May, if the weather is favorable, the tree stands forth in all its glory. No wonder that where large numbers of horse-chestnuts are found growing together people go in thousands to see them when they are in bloom. The leaf is very large and is broken up into leaflets, each large enough to be a leaf on its own account.

There is a smaller horse-chestnut which is a native of Western North America. Its flowers are sometimes tinged with pink. Hardly less beautiful than the horse-chestnuts are the closely related Buckeyes. There are several American species. The flowers may be white, yellow, purplish or red, and they make a fine show on the lawn. None of these trees is related to the true chestnut. That belongs to the Oak Family, while the trees we have mentioned are related to the maples.

There are five trees all belonging to the *Pyrus* branch of the Rose Family, which are very beautiful when in blossom; and, while some of them produce fruit which, in its cultivated form, is much in demand, others bear berries that render the trees valuable from an ornamental point of view. One of the most striking of these is the Mountain Ash, Rowan, which,

picturesque and attractive when in blossom, is a blaze of glory when covered with its clusters of bright red berries. It is in autumn that, as Wordsworth said,

She lifts her head,
Decked with autumn berries that outline
Spring's richest blossoms. . . . The pool
Glow's at her feet, and all the gloomy rocks
Are brightened round her.

HOW THE BIRDS PLANT THE SEEDS OF THE MOUNTAIN ASH

Though so distinct in appearance, the fruits in structure closely resemble the apple and the pear; and birds like the thrush and blackbird are very fond of them. They soon strip the tree; but the seeds are not wasted, for, after eating the fleshy parts of the fruits, the birds drop the seeds and so plant them over a wide area. The cream-colored flowers are remarkably like those of the hawthorn, and have a similar fragrance.

While the mountain ash grows into a respectable tree in suburban gardens and bears well there, it is in its native state that it reaches perfection. It is found wild throughout Europe and in the north of Asia and America. In the western parts of Scotland it reaches a height of forty or fifty feet, with a straight trunk covered with smooth gray bark.

The tree is often called the Fowler's Service Tree, and its botanical name, *aucuparia*, is from the Latin word for "fowler"—bird-catchers in France and Germany bait their traps with rowan berries as a sure lure for thrushes and fieldfares.

THE WHITEBEAM TIMBER USED FOR MAKING COGWHEELS

The rowan's near relative, the Whitebeam, has flowers and fruit that resemble those of the mountain ash. It looks different, however, for its leaves are egg-shaped, with saw-like edges, while the rowan's are feather-like, with from thirteen to seventeen leaflets. The fruits are like Siberian crabs in shape, and are pale red in color. Like the rowan berries, they are used as bait by bird-catchers. In some place they are called chess apples. The whitebeam is by no means so common as the mountain ash. The timber is hard and is often used for making cogwheels.

The Wild Service Tree is very much like the whitebeam, but the dark glossy leaves, which at times grow four inches long and three inches broad, are lobed something like the maples, and the fruits are greenish brown when ripe. These

fruits, which grow in clusters and are very abundant on the tree, have a rough, acid flavor. When mellowed by frost or when overripe, they are agreeable, and are sometimes eaten. Though the wild service tree rarely attains a great size, it sometimes reaches a height of fifty-four feet, with a trunk eleven feet round.

The Wild Apple, or Crab, as it is often called, is probably the ancestor of all the splendid apples grown to-day. Its small sour fruit has given us the word "crabbed," to describe a disposition that is anything but sweet and attractive. The blossom is beautiful, and no flower has more daintily colored or more delicate petals. They vary from white to rose-red, and a wild apple tree in blossom in May is one of the loveliest sights to be seen in the countryside. Even in autumn, when the crabapples, yellow and red, hang on their slender stalks, the tree is very attractive. The fruits, eaten raw, are harsh and acid, but a delicious jelly can be made from them, and they are greatly prized when pickled whole.

THE DIFFERENCE BETWEEN THE WILD PEAR AND WILD APPLE TREES

The Wild Pear tree can always be distinguished from the wild apple, even in winter, because it has the shape of a pyramid, whereas the crab tree is rounded. It may grow fifty or sixty feet high, but the wild apple rarely exceeds twenty or thirty feet. The apple branches, too, are far more crooked than the pear's. The wild pear is not so common as the crab. Its fruit is not edible, but all the splendid varieties of pears which we eat raw or preserve in syrup are derived and developed from this wild species. The flowers are white without the rose markings of the apple, and are less beautiful. They grow in clusters of five each, and measure an inch or more across. The wood of the pear tree, dyed black, provides a close imitation of ebony, and is often used for picture frames.

Another branch of the Rose Family includes the Wild Cherry and the Blackthorn, or Sloe; and in still another branch is the Hawthorn, or May. The European Wild Cherry, often called the Gean in England, is sometimes grown in our parks. It is a tree twenty or thirty feet high, with smooth bark and drooping pointed leaves that are downy on the under-surface. In favorable soil the gean may reach forty feet, and it is then a very beautiful tree,

for in spring its clusters of white blossoms clothe it as with a mantle, and in autumn the leaves turn a bright crimson. Directly it ripens the fruit is greedily devoured by the birds.

THE WILD CHERRIES FROM WHICH OUR GARDEN FRUITS HAVE COME

There are several other species of wild cherry. One—the dwarf, or red, cherry is a shrub rarely more than eight feet high, and the other—the bird cherry, is a small tree ten or twenty feet high. The Japanese cherry has been introduced and grows well in some places. Cherry wood is fine-grained and red in color, and is much used by cabinetmakers and for musical instruments. All our cultivated varieties of cherries are derived from wild species. The gean, it is believed, gave us the red-fruited kinds and the dwarf cherry gave us the black-hearts. The cherry seems to be a favorite tree of the woodpecker, which may often be heard perforating the trunk in search of the larvæ of insects hiding under the bark.

The Blackthorn, which bears sloes, is generally seen as a hedgerow shrub, but if left alone and not trimmed down, it will grow into a small tree twelve or eighteen feet high. It gets the name blackthorn in contrast to whitethorn, another name for hawthorn, not on account of any difference in the color of its flowers, but because its branches are covered with blackish bark, while those of the hawthorn have a much lighter color.

The blackthorn flowers at the end of March or the beginning of April, often before its leaves have appeared, and it is one mass of blossom just when the hawthorn is only beginning to unfold its leaves. Unlike the hawthorn's, however, the blackthorn's flowers have no scent.

THE SLOE OF THE BLACKTHORN WHICH HAS GIVEN MANY LUSCIOUS PLUMS

The fruit, which is something like a small damson, is purplish black. When ripe it is covered with a beautiful bloom which, like all blooms, is one of Nature's protections for the fruit. Sloes are far too harsh to eat raw, but some people gather them to make a beverage. In France the unripe fruit is sometimes pickled and used as a substitute for olives. It is remarkable to think that from this harsh and unattractive fruit there may have been developed all the luscious varieties of plums that we enjoy to-day. An excellent ink for marking linen is made

from sloe juice by adding a little sulphate of iron to give permanence. The dried leaves of the blackthorn have often been used for adulterating tea.

Like the blackthorn, the Hawthorn, or Whitethorn, is a member of the Rose Family, and is more generally seen as a hedgerow shrub than a tree. Nevertheless, if allowed to grow freely in suitable soil and surroundings, the hawthorn becomes a tree forty feet high, with a trunk girth of anything up to ten feet. It makes a splendid plant for a hedge. Its numerous branches and network of twigs grow so densely that nothing can pass it. Indeed, the name hawthorn is derived from the Anglo-Saxon *haga*, an inclosure. The thorns are the spines with which the plant is so well armed as to add to its usefulness as a hedge round an inclosure. The name for the well-known red fruits, haws, is derived from the name of the tree, and not vice versa, as is generally the case.

THE FRAGRANT HAWTHORN, MUCH PRAISED BY THE POETS

The hawthorn is very common in America. Its flowers, fruits and leaves all make it easy to identify. The leaves, which appear before the blossoms, are lobed, and vary very much in size and in the extent to which they are divided. It is the fragrant blossom—the May, as it is called, from the month in which it generally appears—that makes the hawthorn one of our favorite wild plants and the best of all hedgerow trees. Poets have sung its praises since poetry was written.

The crimson berries that succeed the flowers are so numerous at times as to give the impression of a crimson cloth. They are eaten as food in times of scarcity, in some lands, and peasants make from them a fermented drink. Old books refer to them as "good food for hogs," and we are told, "the swineherds do beat them down for them."

Sometimes when the hawthorn grows on a clay soil its blossoms are tinged with pink, and occasionally they are red. The Red May of our gardens is a variety derived from these wild plants. The fruit, too, like the blossom, varies from time to time, being sometimes woolly and sometimes yellow in color. Birds love the fruits, and many insects find food and hospitality on the leaves, including the larvæ of the brimstone moth, the black-veined white butterfly and the lackey

moth. The scent of the hawthorn seems to be particularly attractive to flies, which may generally be seen dancing round the tree on a sunny day. Honey is found in hawthorn flowers partly concealed by hairs, and the flower is generally pollinated by insects that visit the blossoms for the honey. But, in the absence of insect visitors hawthorn flowers pollinate themselves.

HOW SHAKESPEARE MADE A POPGUN FROM AN ELDER BRANCH

Another familiar hedgerow tree is the Elder, a member of the Honeysuckle Family; but, like the hawthorn and blackthorn, it is more often seen as a large shrub than a tree. However, it may grow to a height of twenty feet, and as it grows very rapidly, it is often planted in new hedges that are wanted to develop quickly. It throws out juicy shoots that very quickly toughen into wooden tubes with pith inside, and boys like to make pea-shooters and popguns out of elder branches by removing the pith. Shakespeare had evidently done this in his boyhood, for he speaks of "a perilous shot, out of an elder gun." The ancient Greeks made musical pipes from the elder wood.

The leaf, which is of the feathered kind, is divided into five, seven or nine oval leaflets, with toothed edges, and occasionally we find a curious variation, the leaflet being cut into irregular segments. This, however, is probably an escape from a garden of a cultivated variety of elder. The clusters of creamy white flowers appear in June and possess an odor that some people find objectionable.

The flowers are succeeded by a profusion of deep purple berries, and these are really compound drupes, or stone-fruits with several stones, each containing a seed. From time immemorial these have been gathered by country people to make elderberry wine. As a medicinal plant the elder used to be in great demand, and every part of the plant—root, bark, leaves, flowers and berries—has been used for some healing purpose.

THE HANDSOME HOLLY WHICH MAY GROW INTO A TALL TREE

Certainly one of the most distinctive of our ornamental trees, and one of the handsomest in a sombre way, is the Holly. The European holly cannot stand very cold weather but is widely grown in the United States. The American holly resembles it closely. Generally the holly is

seen as a bush kept down by clipping, but it may grow into a tree forty or fifty feet high. In Surrey, England, there is one eighty feet high, and in the New Forest there are holly trees whose trunks are eight or nine feet round. Hollies were probably more common in England in olden times than they are to-day, and the plant has given its older name of *holm* to places such as Holme, Holmhurst, and so on.

Evelyn, the diarist, was very proud of the holly hedge at his home, Sayes Court, on the banks of the Thames, where Peter the Great stayed for a time during his sojourn in England, and, barbarian as he was, ruined the beautiful gardens. "Is there under heaven," writes Evelyn, "a more glorious and refreshing object of the kind than an impregnable hedge of about four hundred feet in length, nine feet high, and five in diameter which I can show in my now ruined garden at Sayes Court (thanks to the Czar of Muscovy) at any time of the year, with its armed and varnished leaves, the taller standards at orderly distance, blushing with their natural coral? It mocks the rudest assaults of the weather, beasts, or hedge-breakers."

In shape the holly tree is a pyramid, and it thrives particularly well on a sandy soil. The trunk is covered with smooth bark, pale gray in color, and from it is made the sticky bird-lime which bird-

catchers use to entangle the feet of young birds. No other tree has its foliage so well protected against would-be foes. Grazing animals are kept off by the sharp, formidable spines that project at all

angles, and it is a remarkable fact that, though when the holly is a low bush all its leaves are protected in this way, when it grows into a tall tree the upper leaves are generally smooth-margined.

The flowers of the holly are small and inconspicuous individually, but as they are white and grow together in clusters, they make a good show on the bush in May and June, and even later. Staminate and pistillate flowers often appear on the same tree, but there are many hollies that bear flowers of only one kind, and this explains why a tree which is loaded with blossoms summer after summer often produces no berries. Its flowers are all staminate.

The berry, or fruit, is like that of the elder—a drupe, or stone fruit, of the compound form—that is, instead of having only one stone and seed inside the fleshy part, like a plum or cherry, it has four little stones, each with its seed. The

berries ripen in September, when they become bright red and very glossy, and the holly tree then looks its best. If other berries are abundant the holly may retain its berries all through the winter, for they are hard and unpalatable to small birds,



The elder of the hedgerow.



The elder blossom.

which eat them only when other foods fail. Blackbirds, however, like them.

The wood of the holly tree is very hard and of fine texture, and, as it is almost as white as ivory and takes a fine polish, it is in great demand by cabinetmakers for veneering and inlaying. It is often used as a substitute for boxwood and, when dyed black, for ebony.

THE BEAUTIFUL LABURNUM WHICH THRIVES IN ALMOST ANY SOIL

Several beautiful trees that belong to the Pea Family are grown not only in our gardens but are sometimes found wild. The first of these is an escape from gardens, and the seed came from some tree growing in cultivated ground close by. The tree we mean is the Laburnum. Since it produces an abundance of seeds arranged in pods and thrives in almost any soil, it may seem curious that it is not found wild far more often. One explanation is that rabbits are so fond of the bark of young laburnum trees that they destroy many of them.

The laburnum is a native of Central Europe, but has been long grown in America. Generally it does not grow more than twenty feet high, but specimens of thirty feet are by no means uncommon. The spreading branches bend over and droop very gracefully at their tips, and the tree has the appearance of a playing fountain. The bark, in the early years of the tree, remains quite smooth, but later it furrows transversely, and pieces come off the trunk. The leaf has a long stalk and carries three pointed leaflets. The most characteristic thing about the laburnum is the blossom, which, from its graceful drooping form, has been variously named golden rain, golden chains and golden earrings.

THE FLOWERS OF THE LABURNUM AND THE DANGER THAT LIES IN THEM

The flower-stalk projects from the branch horizontally and bears a wealth of brilliant yellow flowers, described by the poet Cowper as "rich in streaming gold." These develop into long downy pods containing many seeds, which should never be eaten, for they are extremely poisonous. The pods hang on the tree generally till the next season's blossom has appeared. Laburnum wood is used a good deal by musical-instrument makers and by turners.

The other member of the Leguminous, or Pea, Family referred to is the Locust

tree, or False Acacia, as it is sometimes called because of its resemblance to its relative, the acacia. The locust tree is a native of North America, and was introduced into Europe at the beginning of the seventeenth century. It is a graceful tree which grows rapidly in the first ten years of its life, often attaining a height of forty feet, and then it grows far more slowly. The leaves are very feathery, being divided into a large number of small oval leaflets. The flowers are remarkably like those of the laburnum, but larger, and white or flesh-colored. They have a sweet scent.

There is another member of this family which makes a brave show in the woods or when transferred to the lawn. This is the Redbud, or Judas Tree (*Cercis canadensis*), found growing in North America from Canada to Florida and Texas. The reddish purple flowers appear before the leaves, about the same time as the early violets. The leaves are heart-shaped, and the green pods turn to purple in the late summer. The European Judas Tree, from which the American was named, is not the same, though it is a relative.

In the United States the magnolias are among the most prized of Southern ornamental trees. There are half a dozen species, all beautiful. The Laurel Magnolia is one of the most beautiful trees in the world. Its white waxy flowers are sometimes eight inches across. Attempts to grow it in the North are not very successful. Another magnolia, the Cucumber Tree, is much hardier, and can be easily grown where winters are not too severe. The flowers are yellowish green, and are half concealed among the leaves. The seed-cases resemble cucumbers and turn from green to pink to vivid red as they mature. When the case opens the scarlet seeds hang out.

One other tree grown for ornament may be mentioned here, and that is the Plane tree so often found lining the streets of cities and towns. It is particularly fitted for this, for, unlike most trees, it seems to thrive in a smoky atmosphere. The leaves and bark become coated with soot, but a shower cleans the leaves, and the old bark is thrown off in large flakes by the pressure of the new bark underneath. The plane usually grown is a variety of the common Oriental plane, with leaves less deeply divided.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4507.

THE HORSE-CHESTNUT'S SILVER FLOWERS



There is no finer sight presented by Nature than a horse-chestnut tree in full bloom. The leaf of this tree is split up into leaflets, and these are so large that many people think that each separate leaflet is really a complete leaf. The tree has been endeared to children by the poet Longfellow.



The fruit of the horse-chestnut looks so much like that of the sweet chestnut that many people think it is a variety of that tree, but, as a matter of fact, the two trees belong to distinct families. Here we see a horse-chestnut "in all the richness of its heavy velvet drapery, embroidered over with millions of silver flowers." It came to us from Asia by way of Europe, but is closely related to our buckeyes.

THE WILD APPLE TREE'S DAINTY BLOSSOM



The leaves of the wild apple tree vary very much in shape, as may be seen. They are smooth on the upper surface, but sometimes downy underneath.



Few flowers that grow on trees present a more beautiful sight than the clusters of wild apple blossoms, with petals delicately tinted with pink.



We all know the crab-apple tree, which is so beautiful in spring when it is covered with a mass of exquisitely beautiful pink blossoms, with a spicy fragrance. In some parts of the country cider is made from crab-apples, and the crab-apple jelly is a favorite delicacy.

THE HOLLY WITH THE PRICKLY LEAVES



The white flowers of holly are small, but, like the red berries that come later, they are conspicuous because they grow in such great numbers.



Cattle like young holly leaves, and on the lower branches spines develop. Higher up, out of reach of animals, the leaves have no spines.



We know holly best as a bush, but it grows to a tree forty feet high. When covered with red berries, it is a great sight. This is a European holly tree, on which the berries grow in clusters.

THE LABURNUM'S GOLDEN EARRINGS



There is no prettier sight than the laburnum with its clusters of yellow flowers, like ear-rings.



Leaves and flowers appear in May, and the leaflets form in threes on long slender stalks.



The laburnum grows about thirty feet high, but does not throw out very long branches. The tree is a native of Europe, but will grow in this country. Its branches and leaves are poisonous to cattle.

THE WILD SERVICE TREE OF EUROPE



The flowers of the whitebeam are remarkably like those of the wild service tree; in fact, the one blossom is often mistaken for the other. The leaves of the two trees, however, are different.



The wild service tree is very common in Europe. Though ornamental, it does not often grow very high. The greenish brown berries are sold in fruiterers' shops, for, though rough and acid when fresh, they are pleasing when mellowed by frost. Our service-berry or shadbush is quite different.

THE BLACKTHORN THAT GIVES US SLOES



The white blossoms of the blackthorn produce sloe berries, used for adulterating cheap wines. Years ago, when tea was dear, old country people made tea from blackthorn leaves.



Blackthorn is called by this name not because its flowers are darker than those of the whitethorn, or hawthorn, for they are whiter, but because the bark is nearly black. Probably our plums are descended from this tree. In Europe the wood is much valued, as it is hard and takes a fine polish.

THE HAWTHORN'S FRAGRANT BLOSSOM



Hawthorn rarely grows larger than a bush in places where cattle have access, because the animals are fond of the leaves and young shoots.



The hawthorn is the fragrant blossom which poets call the "may." It is usually white, though sometimes it will be found tinged with pink.



This is the famous English hawthorn, the "may" of the poets. Unlike our hawthorns, the odor of its flowers is exquisitely sweet. It has been introduced into this country and is prized, not only for its sweetness, but for the wild beauty and grace of the tree. In Europe it is often used for hedges.

THE WILD CHERRY OF THE COUNTRYSIDE



The leaves of the wild cherry are deep blue-green in color, and grow on slender branches. When the tree is in bloom it is covered with delicate cup-shaped flowers, which later produce myriads of cherries.



This is a fine specimen of the wild cherry tree, for usually it is a mere bush. The luscious cherries of the orchards are descended from wild cherries. Many of those grown in this country were imported.

THE PLANE TREE OF CITY AND TOWN



The broad leaves of the plane give the tree its name, for "plane" means "broad." The leaves are like those of the maple, but the trees are not related. The flowers grow in balls like old-fashioned buttons.

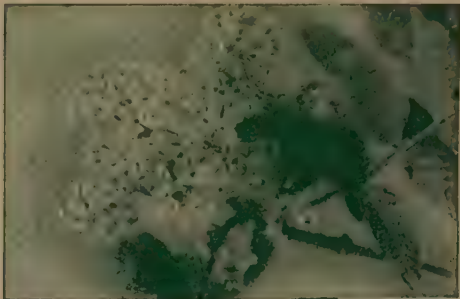


The plane is the most long-suffering of trees, for smoke and dirt seem not to affect it. Even when the bark and leaves are covered with soot the tree flourishes, and this is way it is so useful for planting in city streets. The plane trees shown in this picture came from Asia by way of Europe.

THE ASH TREE, WHICH WAS USED FOR LUCK



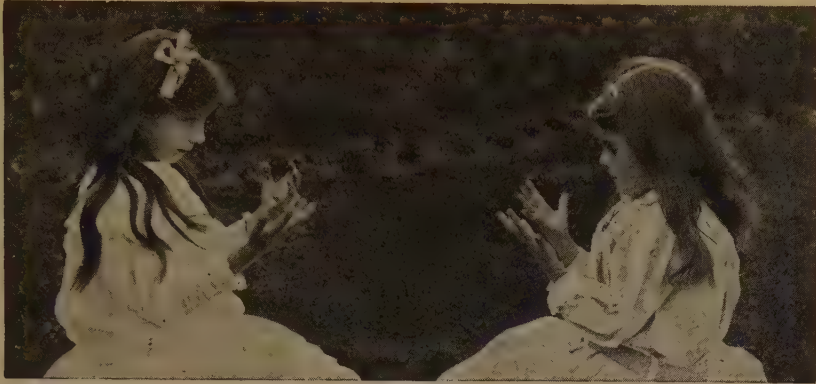
The leaf of the mountain ash is like that of the ash, and hence the name, but it belongs to the Apple Family. It was once thought to bring luck.



We see how different the delicate white flowers of the rowan are from the flowers of the true ash. The flowers are followed by scarlet berries.



The mountain ash will grow almost anywhere in the poorest soil. Its other name, rowan, means "charm." We find our native rowan on hillsides and in rocky woods, while the tree we so often see in parks is generally the European rowan. The tree in full bloom is a charming picture.



WHY DO WE COUNT IN TENS?

YOU may well ask why we count in tens, for it would sometimes be more convenient if we counted in twelves—if we had a *duo-decimal* system of counting in twelves instead of a *decimal* system of counting in tens. That is to say, we should invent two extra single figures for ten and eleven, and then write ten to mean twelve, and eleven to mean thirteen, 100 to mean 144 (twelve times twelve instead of ten times ten), and so on.

It is possible we shall do all this some day; and the reason is that, while ten can be evenly divided by only two figures, two and five, twelve can be evenly divided by four figures. Thus, for many purposes it would be better to count in twelves, and, indeed, we often do so when we can, as, for instance, by making twelve inches a foot, and twelve eggs a dozen. This is also the number of months in the year. But we count in tens still, as a rule, and we shall doubtless do so for many a long day yet, simply because our ancestors have always done so.

If you think how you sometimes used to count when you started arithmetic, you will guess the simple reason why. It is because we have ten fingers. When we count on our fingers, as children do, and as the first men did, it is natural to make a fresh start after ten, because then we go

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back again to the finger we began with. So all over the world, and in all times and places, we find men counting by tens just because men and women have ten fingers.

Nature decided on five fingers, or toes, at the end of each limb very long ago indeed—ages before man appeared upon the earth at all. It is true that, at first sight, there seem to be many exceptions to this. We find only one obvious finger, or toe, for each limb in the horse, two for the pig, and so on. But the original figure was five. The hen, for instance, has only three and a half toes, and when we examine the skeleton of its wing—which is really its arm—we find three and a half fingers there. But, as we have already seen in these pages, if we examine the hen's egg before the chicken is ready to break through the shell, we find that it has five fingers, or toes, on the end of each of its four limbs; only the birds have apparently found that they could do as well with three and part of a fourth, so they have stopped developing the rest. We must go far below the reptiles for the beginnings of the five-fingered or five-toed arrangement. If we look at a frog we can see that it has five fingers and five toes, just as we have. So we may say that it was nature that decided ages ago that we should count in tens!

CAN COUNTRY PEOPLE SEE BETTER THAN TOWN PEOPLE?

When we apply it to such a very complicated thing as vision, the word "better" does not mean very much. People may differ in their power of seeing things at different distances in a bad light. They may differ in their power of making out the details of things at a distance, or they may differ in the power of continuously doing the same work with their eyes without getting tired. All these differences exist in various people quite apart from any question as to the need for glasses.

If we took a hundred people, and let those that need glasses wear the most perfectly made glasses possible, we should find that all those people differed in all these respects. For instance, a man may be very much inferior to his neighbors in making out separately two stars that are very close together and almost look like one. Astronomers know very well how they differ from one another in this kind of keenness of sight. But the man who is worst at this may be able to read print on a dark night when the people who beat him at long distances cannot read it at all.

These differences are not yet explained; but probably, on the whole, since country folk generally use their eyes mainly at distances, their vision will be keenest at distances, and in the case of town people it will be the other way around. As to tiredness, the rule is generally that the eyes last longest at the work to which they are most accustomed.

HAS THE EARTH A LIGHT OF ITS OWN LIKE THE SUN?

There is no doubt that the earth had a light of its own long ago. This thoughtful question very rightly suggests that the other planets, too, must surely have had a light of their own at one time, just as the sun has, because the sun and the planets were all made from the same hot cloud, or *nebula*.

But the earth has now no light of its own because it has become cool, while the sun remains hot; so that the earth cannot give out any light of its own, but can only reflect the sun's light. One reason is that the smaller a thing is, the more quickly does it lose its heat. The heat escapes from the surface, and the smaller a thing is, the larger is its surface in proportion to the amount of stuff

in it. You can prove this very easily. Get, if you can, two blocks, one two inches on every side and the other one inch. Measure the surfaces. You will find that the smaller has six square inches of surface and the larger has twenty-four square inches—four times as much. Yet the larger has eight times as much stuff in it.

A baby needs warmer clothing than a grown-up, and small and thin people need more clothing than large people, because in proportion to the mass of their bodies, they have large surfaces from which to lose heat. As regards the solar system, we can learn especially from the moon and from Jupiter. The only reason why the moon should have become so much cooler than the earth, though it is made of the same stuff, is that it is so much smaller. On the other hand, Jupiter is very large, and astronomers are almost sure that the giant planet is still hot enough to give out some light of its own.

DO ANIMALS HAVE DREAMS AS WE DO?

As we cannot ask animals the answer to this question, we must find it out as best we can by arguing from other facts we know. The case is the same regarding babies and very small children before they can speak. But in all these instances we have quite good reason to believe that dreams occur, just as they occur among ourselves as we grow up.

As regards babies and animals, we know that their brains or senses are made on the same principles as ours in every respect. They are exposed to the same influences as ourselves, and so it would be very curious indeed if the same results, such as dreams, did not follow from what are practically the same causes.

In dreams we have feelings of various kinds, and just as our faces largely express our feelings when we are awake, so they do when we are asleep. If we observe the ways in which such an animal as a dog, for instance, expresses its feelings when awake, we may look out to see whether it ever shows the same sort of expression when it is asleep.

We do find signs in animals which plainly show that they are having feelings of one kind or another—and that means that they are dreaming. Of course, their dreams will differ from ours, just as ours differ. A musician and a painter have very different dreams, and

we should expect a dog, in which the smell part of the brain is very important, to dream smells, just as we dream sights and sounds.

HOW DO WE KNOW WHAT IS AT THE BOTTOM OF THE SEA?

We do not yet know all about the bottom of the sea, but there are several ways in which we can learn something of it. We can comfortably study a great deal of what was once at the bottom of the sea, when the sea has gone somewhere else, and has left it high and dry. For instance, we can study chalk cliffs, and learn from them a lot about what the bottom of the sea is like, or has been like.

Then we can send divers down to the bottom of the sea where it is not very deep, and they can look through the glass plates in their diving-helmets and can see the plants and animals of many kinds that live at the bottom of the sea. They can bring some of these up, and we can see for ourselves many of the wonderful creatures that live at the bottom of the blue sea, such as sea-anemones.

But divers cannot go down many scores of feet, and the sea is often miles deep. If we want to learn about the deeper parts of the sea, we must dredge them—that is, let down something at the end of a long rope, that will scrape along the bottom and catch hold of anything that will come away; and then the catch can be hauled up to the surface, and we can study it. This is costly, and takes time, but much of it has been done, and we have already learned a great deal about what is at the bottom of the sea by this means.

WHERE DO ALL THE FLIES GO IN THE WINTER?

Most flies live their lives in spring and summer; then die. Some of them are fortunate enough to find a place where they can hide and obtain warmth.

They hide in quiet places about the house, in out-buildings, in the fields and stables, where we should never dream of looking for them. They do not feed. They simply lie dormant, sleeping as a squirrel in his nest, or a bear in his den, or a tortoise in his shell, sleeps the cold days away.

But an unexpected warm day in winter comes. The fly feels the extra warmth. It wakes him, makes him hungry, and sends him forth to seek food. The warm day passes, and he may get back to safe hiding; but most likely he will not.

Probably the cold will return and kill him. Very few flies manage to get through the winter. If they are not worn out and ready to die at the end of the summer, many of them are killed by a fungus which, floating in the air, settles on their bodies, drives roots into their insides, and destroys them. Those we see dead on the window-pane have been killed in this way. Those that live through the winter lay eggs, and soon there are as many flies as ever. Killing one fly in the spring means many fewer in the summer.

WHY DOES THE STREAM RUN FASTER IN THE MIDDLE?

The water at the side of the stream is constantly being held back by rubbing against the banks, just as the bottom of a wave is held back when it reaches the shallow water near the shore. And so, compared with the water near the sides, the water in the middle of the stream runs more swiftly. It is held back a little by rubbing, or friction, between it and the slower-moving water at the sides; but the friction between water and water is very much less than the friction between water and anything that is solid, such as the banks of a stream.

When we watch the blood running in a blood-vessel, we see exactly the same thing. In the middle of the stream we see the tiny red and white cells tumbling fast over each other as they scurry along. But near the walls of the blood-vessel they move much more slowly, for they are held back by the friction of the wall, even though it is beautifully smooth. And just the same thing happens with smoke going up a chimney, and in many other cases. We should always try to think, when studying such a question as this, of other cases where the same principle of friction is really at work.

IS IT TRUE THAT SOUND GOES ON FOREVER?

There is a true sense in which everything goes on forever, and there is an equally true sense in which nothing in this world goes on forever. Nothing is destroyed, and nothing is without everlasting consequences. But it is no less true that nothing goes on forever *as it was*; for everything changes, and that is what the word "evolution" means—that everything always changes in an orderly way, though nothing is ever lost or destroyed.

No sound lasts forever as a sound.

The waves which made it become weaker and weaker and are heard no more. We may be watching it by scientific instruments which are more delicate than our ears, but after a time they will certainly record the fact that the sound is no more. The waves that made it have been smoothed away.

But all waves, of whatever kind, are made by power, and contain the power that made them; and, because no power is ever lost, this has to be accounted for when sound ceases. We could trace it in the movement of particles of air and of other things; if we knew enough, we could trace the doings of this power in our own ears, and we could also show that a certain amount of heat was produced. The sound ceases as sound, it is true, but its effects do not: they go on forever.

WHY MUST WE CUT THE CLAWS OF CAGED BIRDS?

Such things as bristles, hair, teeth, claws and nails behave differently in various animals, according to the kind of use they are likely to be put to. The rule, on the whole, is that when any of these things are likely to be used constantly in such a fashion as to wear them away, they keep on growing continuously throughout the whole, or nearly the whole, life of the animal.

Our own teeth do not grow continuously, but the teeth of animals often do so. For instance, a hare may die of starvation because it has lost one of its teeth, and the tooth in the other jaw, opposite it, having nothing to rub against, grows and grows, and at last forces the poor creature's mouth open, and so it finally dies by starvation.

Claws and teeth follow the same rules in many ways, for they belong to the same class. A bird's claws are meant to be constantly used. When we keep birds captive, and feed them without work on their part, the claws go on growing because they are no longer worn away by use and the friction, or rubbing down, which that involves, so they need to be cut.

WHAT MAKES A KNOT IN A PIECE OF WOOD?

We know that knots are very common in woods of certain kinds, and in specimens which are good and show no signs of disease. Therefore, knots are natural to these woods, and must have some purpose. The wood that makes knots is

extremely hard, as we know well in carpentering. This hardness is explained when we learn that knots are, as a rule, simply hard places where branches are coming off from a larger stem. At such a place extra strength is naturally required.

In many trees, such as beech and elm and cedar, there are knots found at the surface of the woody part of the stem, and these have really been formed in the bark. They began their existence meaning to be buds, but have been prevented in some way.

These baby buds, as they might be called, stop their development and, being pressed upon by the parts around them, they become very firm and hard. If they are cut across, we find that they are made of circles of woody material laid, or packed, very closely together.

WHY DOES DAMP AIR OFTEN MAKE US ILL?

Damp air is often cold air, and the cold has usually been blamed for making us ill, though many facts prove that it is not the real reason at all. There is one great difference between damp air and dry air, and this is what accounts for the fact that people usually feel at their best in dry air, while many feel at their worst in damp air.

Water is always leaving our bodies by many channels, such as the skin and the breath. When the air is dry, this journey of water is readily made; but when the air is damp, it already contains a quantity of water, and so does not easily take up more, and the passage of water from our bodies is, to a certain extent, checked.

If life is to go on, enough fresh water must always be supplied to the living body, no matter whether it be a man or an animal or a plant. When the passage of water is slowed, as it is in damp air, then the processes of our lives are checked and our bodies are apt to get choked up with things which would otherwise have been burned up and got rid of. This seems to be the real reason for the effect of damp air upon rheumatism.

WHY CANNOT WE BREAK AN EGG IF WE HOLD IT LENGTHWISE?

It is not exactly true that we cannot break an egg held lengthwise, but certainly it is much more difficult to break the shell when we apply pressure to it at the two ends.

Our answer is that it depends upon the shape of the shell. It might possibly be

that the shell is made thicker at the ends, or it might be that the shell is made of threads or fibres running in a particular direction, but that is not the explanation here.

We may think of the eggshell as made up of arches. Now, when an arch is narrow, it is much stronger, other things being the same, than if it is very wide and flat.

The more upright and narrow an arch is, the more directly does the mass of it resist any pressure from above. In fact, if an arch is narrow enough, it is almost the same as a straight pillar, or column, which directly resists the weight of anything upon it. On the other hand, if the legs of an arch are wide apart, they cannot possibly resist so well, but will be likely to be forced away from each other more easily, and then the arch will break.

Now, we may look upon the egg, when we press it from side to side, as made of two wide, and therefore weak, arches. When we press, we are pressing chiefly against the thickness of the shell, and that resists us little. But when we press the ends, we are met by narrower arches, and we are pressing not only against the mere thickness of the shell from outside to inside but also against the length of it from end to end of the egg.

WHY DOES A SHADE MOVE WHEN HUNG OVER THE GAS?

If we could watch closely the air above a lighted gas-jet, we should see that it is continually in rapid motion. Indeed, so powerful is this motion that in some cases a room is better ventilated and has purer air when lighted with gas, which keeps the air moving, though it uses the air up, than when it is lighted with electricity. Of course, the moving air strikes anything near it, such as a shade, and if the shade is hanging loosely, it will move.

The gases produced by the burning of gas are principally carbon dioxide and water in the form of a gas—water-vapor, as it is usually called. These gases, made by burning, are naturally very hot, and so they rise quickly through the colder air in which they find themselves because that air, being cooler, is heavier. More than this, water-vapor is itself much lighter than air, even when it is not hotter, and so that is another reason why the gases from a burning gas-jet rise quickly and disturb anything that is in

their way, such as the shade hung lightly over a gas-jet.

It would be quite possible to make these hot gases do work if we balanced some sort of wheel in their way, just as we place a mill-wheel in the way of a stream of water and so make that do work. But the particles of gas are much lighter than those of water, and as power depends on speed and weight, there is not really a very large amount of power to be derived from their motion.

WHAT WERE THE ANCIENT OLYMPIC GAMES?

The ancient Olympic Games were celebrated every four years at Olympia on the bank of the river Alpheus in Greece. From very early times this was a sacred place to the Greeks. Temples of the gods were built, and festivals in their honor were held here. Just when the games began and who founded them, we do not know, but we have a list of winners beginning with 776 B.C. and ending in 394 A.D., a period of 1,170 years. Here all the best athletes of Greece met, and the winner of any event was taken home in triumph, and was sometimes supported by the public for the remainder of his life.

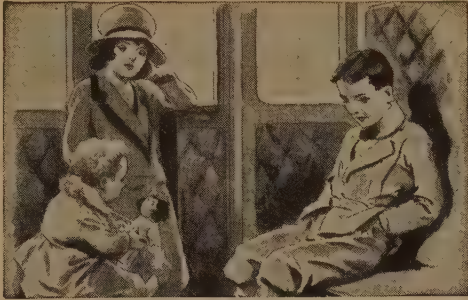
Only Greeks of good character might contend, and they were required to train faithfully for ten months before the games. There were foot-races, short and long, jumping, throwing the javelin and the discus (a bronze plate), wrestling and boxing. Later chariot-racing and races on horseback were added. There were special contests for boys in running, wrestling and boxing. There was also a contest of heralds, and the victor in this was allowed to announce the winners to the great crowds. The prizes were crowns of wild olive from the sacred tree.

The Greeks considered the games so important that a sacred truce was declared, if any states were at war, so that both athletes and spectators from all the states might travel in safety. The four years between the games was called an Olympiad, and time was reckoned by them. For example, an event might be said to occur in the second year of the one hundred and seventy-second Olympiad. Sometimes the Olympiad was named for the winner of the foot-race. On page 1075 you may see some pictures of these games.

THE NEXT WONDER QUESTIONS ARE ON PAGE 4503.

FRENCH—IN SIGHT OF THE SEA

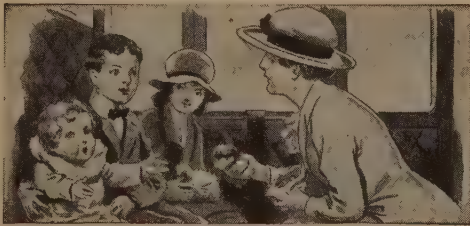
First line, French; second line, English word; third line, as we say it in English.



Nous sommes fatigués de jouer.
We are tired of to play.
We are tired of playing.

Bébé dit qu'il a faim.
Baby says that he has hunger.
Baby says he is hungry.

Nous avons tous faim.
We have all hunger.
We are all hungry.



Maman nous donne des pommes.
Mamma us gives some apples.
Mamma gives us apples.

Toutes les pommes sont rouges.
All the apples are red.
All the apples are red.

Elles viennent d'un jardin anglais.
They come from a garden English.
They grew in an English garden.



Bébé laisse tomber la sienne.
Baby lets to fall his.
Baby lets his fall.

Il recommence à pleurer.
He begins again to cry.
He begins to cry again.

Papa se baisse pour la chercher.
Papa himself stoops in order it to find.
Papa stoops to find it.



Papa donne la pomme à bébé.
Papa gives the apple to baby.
Papa gives the apple to baby.

Le train s'arrête.
The train itself stops.
The train stops.

Papa perd ses lunettes.
Papa loses his spectacles.
Papa loses his spectacles.



Maman les ramasse.
Mamma them picks up.
Mamma picks them up.
Nous sommes à Douvres.
We are at Dover.
We are at Dover.



Nous descendons du train.
We get down from the train.
We get out of the train.

THE NEXT FRENCH STORY IS ON PAGE 4490.



A land mine fired with a powerful chemical explosive.

TRANSFORMATIONS OF MATTER

THE CHEMICAL COMPOUNDS

CEASELESSLY seeking for the bricks and mortar of which the earth, the sun and all the stars are made, chemists have found 88 unchanging substances which we call elements, and, as we have seen, they believe that there may be four more which have not yet been found.

Some which are known are very rare, and difficult to separate from other things. They are obtained with great labor by chemists, and are collected grain by grain and year by year in out-of-the-way laboratories. Such, for example, are the rare earths whose very names are unfamiliar: somarium, europium, ytterbium, lutecium, erbium, and half a dozen more.

Other elements were almost as hard to find, like the inert gases which so long played hide-and-seek in the air and then came out into the open: helium, neon, argon, krypton, xenon and niton.

All have heard of the sudden and even more upsetting discovery of the radioactive metals—radium, actinium, thorium, uranium, and the elements into which they surprisingly change.

Then there is a group of metals not so strange as these, yet for long strangers to knowledge because they are found in very small quantities, though some of them show that a

CONTINUED FROM 4292



metal can be both little and good by playing a worthy part in things that are used in daily life: rubidium, yttrium, molybdenum, chromium, osmium, iridium, all of which do something when mixed with commoner metals.

There are noble metals like gold, silver and platinum; heavy metals like lead, tin and zinc; light ones like lithium and beryllium. But, of all the elements we have named, none has any large share in building up the earth, the sea, the air, or the living things which move therein.

Here is the list of the elements of which the world and all that is in it—alive and not alive—is chiefly built, in order of the quantity in which they occur: oxygen, silicon, aluminium, iron, calcium, magnesium, sodium, potassium, hydrogen, titanium, carbon, chlorine, bromine, phosphorus, sulphur, barium, manganese, strontium, nitrogen and fluorine.

At the top of the list, oxygen supplies nearly half the material of the visible world. At the bottom, fluorine contributes one-tenth of one per cent. All the other 72 elements together make up only half of one per cent of the earth's surface, its oceans, the air above it, and the life which dwells on it.

We began rightly by thinking of the

atoms as systems of electric particles, quite simple in the hydrogen atom when there was only one electric particle to consider, but by no means so simple when we thought of the eight flying particles of oxygen, or the fourteen of silicon, or the seventeen of chlorine. We might imagine, when we considered that electric particles sometimes attract one another and sometimes repel, that if atoms of these different systems came near one another, they might sometimes hold out a friendly electric hand to one another and unite with their hand-clasp. But when we come to account for all the countless combinations between oxygen and nitrogen and carbon and sulphur, and all the rest of these common bricks that have been mentioned, this way of accounting for the unions is altogether too much for us.

THE TWO STREAMS OF ELECTRIC ENERGY THAT JOIN TOGETHER

What the chemists tell us to do is to imagine that all these atoms of the elements have electric hooks, which may perhaps be described as separate streams of electric energy proceeding from them. The streams may be electro-positive or electro-negative; in other words, the free negative electric hook of one atom will clasp the free positive electric hook of the atom of some other element. The two will join so tightly as to form a combination which is as much a thing by itself as an atom, and in many ways behaves like an atom. It is not an atom, because it is a wedding of at least two kinds of atoms. It is actually a molecule, which is a combination of atoms.

But a molecule may be more than a wedding of two atoms: it may be a whole family of atoms all tightly linked together. That is possible in the first place because atoms may have more than one hook for purposes of joining with others.

THE ATOMS OF HYDROGEN AND OXYGEN THAT MAKE A MOLECULE OF WATER

Oxygen has two hooks. When it joins with hydrogen to form water we may imagine it as holding out two hands, one on either side, and so clasping two hydrogen atoms, which is why water is denoted in chemistry by the symbol H_2O , or two atoms of hydrogen joined with one atom of oxygen to make the molecule of water.

Water is one of the simplest of the compounds, possessing only three atoms

in its molecule; but there are others as simple, or simpler. The gas that chokes miners is one of them; "choke damp" the miners call it, but its scientific name of carbon monoxid shows that in its molecules one atom of carbon is joined to one atom of oxygen, and therefore there are only two atoms in the molecule.

But by far the larger number of substances have much more elaborate molecules than that. Sulphuric acid, which is one of the commonest things in chemistry, has two atoms of hydrogen, one of sulphur and four of oxygen—seven altogether. Aniline, which is one of the foundation stones of the coal-tar dyes, has six carbon atoms, seven hydrogen and one nitrogen—fourteen in all. Trinitrotoluene which was used as a bursting charge for projectiles in the World War has twenty-one atoms, contributed by oxygen, hydrogen, nitrogen and carbon.

But even these massive molecules are mere rifle bullets compared with the big shells of some of the higher molecules, especially of those which are of the stuff of living matter, such as protoplasm. There are atoms which fill the molecule as shrapnel fills the shell-case, and may run up to the forties; cane sugar has forty-five.

THE LITTLE ELECTRIC HOOKS THAT HELP TO CHANGE SUGAR INTO STARCH

When we think of a molecule of that kind, and imagine its powers of joining with other molecules, we must picture its little electric hooks sticking out all over it, like almonds out of a plum pudding. But, whether there are two atoms in the molecule or ninety, every molecule is alike in this, that the substance of which it is the smallest possible bit, can be split up and split up till it can be split up no more, but the molecules will remain unaltered.

How, then, can a substance be altered if its molecules persist in remaining unaltered? How, for example, can starch be turned into sugar? In one way only, and that is by making such use of the electric hooks which stick out of the molecules that they will hook on to some other atom or molecule, to which they will cling even more tightly than to the members of their own molecule family.

Some elements, it is said, have an affinity for one another. Oxygen will cling to almost any element, even to a smooth hard metal. Some have no affini-

ties at all, like that group of gases which Lord Rayleigh and Sir William Ramsay found hidden in the air about a quarter of a century ago. Argon, neon, krypton, xenon were able to hide so successfully in the common air because they never combined with anything outside it. Nitrogen, the most common gas of the air, is a rather contradictory element as a compounder. It is hard to force into a union, and, once in a combination, is equally hard to get out.

THE MANY WAYS IN WHICH NEW COMPOUNDS ARE FORMED

This inclination to join with other things is altogether a puzzling and very varying quality of the elements. Sometimes the bodies have only to come into contact and the chemical interchange at once begins to work, as when the metals sodium or potassium are brought near the oxygen of water. Sometimes molecules combine only in the light.

Heat is the readiest way of inducing molecules to put out their feelers, though some want a great deal of warming up. Electricity is another way. It is usually helped in its work when the molecules of the substance are floating in a liquid. But while it is not possible to say why some elements combine more readily than others, or why they prefer combination with some of their fellows more than the rest, they always unite in fixed and definite proportions.

THE POWER OF THE ELEMENT TO BIND THE HYDROGEN ATOM TO ITSELF

There is another law of combination which is not so unchanging. Consider some common substances. There is hydrochloric acid, or muriatic acid, which is only less well known than sulphuric acid. But instead of the seven atoms of sulphuric acid, it has only two atoms in its molecule, one of hydrogen and one of chlorine; then water, which all know as H_2O , or two atoms of hydrogen and one of oxygen. After that consider ammonia, where three atoms of hydrogen join one atom of nitrogen (NH_3). Finally there is marsh-gas, not so very unlike the coal-gas that we burn, where carbon with one atom links with four hydrogen atoms to form the CH_4 molecule.

From this will be seen that while chlorine can bind to itself only one atom of hydrogen, oxygen can take two, nitrogen takes three, and carbon takes

four. The chemist has names for these powers of affinity. He speaks of an element's *valency* (from the Latin word *valere*—"to have power"), which is its power to bind the hydrogen atom to itself. Chlorine takes one atom and so is called *monovalent*. Oxygen can take two and is called *divalent*. Nitrogen is *trivalent*; and carbon, which is the great binder in all the things that live and all the substances that have lived, is *quadrivalent*, a very powerful element indeed, and as universal as it is powerful.

There are atoms which have greater combining powers than this, though none can hold and keep more than four atoms of hydrogen. They can clasp to themselves more atoms of oxygen than that. Sulphur can combine with six atoms of fluorine. But these are the higher powers of combination. Some atoms have a double combining power. Carbon, which is *quadrivalent*, can become *divalent*. It does so in that evil-smelling gas which is called carbon bisulphid, and wherein carbon is joined to two sulphur atoms.

THE ACIDS AND THE ALKALIES, AND THE SALTS THEY MAKE TOGETHER

When combinations between combinations have to be considered, the way is more difficult. Of these the chief are called acids, on the one hand, and alkalies or bases on the other. What is an acid? If we give up the idea that it can be recognized by a sour taste, which is by no means always true, we have to content ourselves in the main by saying that it is the opposite of an alkali; and that the acids will combine with the alkalies to form a salt or a neutral body. We can go still a little farther. The acids, which always have some hydrogen in their make-up, ally themselves with the metals, and so we can think of the hook they hold out as *electro-negative*, while the alkalies, which ally themselves with the non-metals, may be put down as *electro-positive*. It must be noted that before an acid can come into action with its hooks it must have water in the neighborhood, and so must an alkali.

These combinations—acids, alkalies, salts—are very different from the elements which make them up. They are more active to begin with. Sulphur, hydrogen, oxygen are all quiet elements, but put seven atoms of them together into sulphuric acid and the combination will burn through wood. Nitric acid,

which is nothing but inert nitrogen with one atom of hydrogen and three of oxygen, is another destroyer. Nor are the alkalies far behind. Caustic soda, caustic lime, combinations where oxygen and hydrogen join with sodium or calcium, are as powerful as the acids.

THE CARBON COMPOUNDS, WHICH OUTNUMBER ALL THE OTHERS

The salts which acid and alkali form together are on the whole mild. A familiar example is soda ash, the production of which has been one of the most valuable chemical industries for more than a century. Perhaps we shall best see how the affinities work by considering its production. People sometimes speak loosely of carbon dioxide as carbonic acid. It is not that. The real carbonic acid arises from combining carbon dioxide, or CO_2 , with water, H_2O , which should give a product of H_2CO_3 . As a fact, that product can never be got to exist by itself; but if sodium can be introduced and induced to take the place of the hydrogen, the carbonate, or soda ash (Na_2CO_3), is formed.

The carbon compounds outnumber all the others put together. They are, as we have said, part of life and living things, a part of all matter that is formed of living cells. They were thus called organic compounds, because it was supposed that the life-like forms they built up could never be imitated in the chemist's laboratory.

Though that is no longer true, it is a very good distinction. We now have what are called synthetic drugs, dyes, and foods made by chemists who have found ways of adding carbon, hydrogen, oxygen and nitrogen together, and keeping them in combination after Nature's fashion in growing them. The German chemist, the late Emil Fischer, made an artificial chemical like the *peptone* which the body produces to digest food; and another chemist has made artificial *adrenalin* like that which is produced by the glands of the throat. Even so the distinction between living and dead matter is not wiped out.

THE BIG CIRCLE OF ALLIES WITH WHICH CARBON WILL JOIN

Apart from that, carbon has a tremendous circle of allies with which it joins. The commonest alliances are those with hydrogen and oxygen in coal. It does not readily ally itself to nitrogen, but it

can be done, though the alliances are of a peculiarly belligerent kind—they result, to begin with, in the production of potassium cyanid, and from that can be obtained the dangerous prussic acid. With hydrogen, carbon first joins to form the long row of hydrocarbons, of which ethylene and acetylene and marsh-gas—the fire-damp of coal-mines—are the best known. When marsh-gas (called methane) is prepared in the laboratory, it can then be got to part with three of its hydrogen atoms in exchange for three atoms of chlorine; and so we arrive at chloroform. Or the chemist can substitute for the hydrogen three atoms of iodine; he can do so because one of the peculiarities of chemical compounds is that most of them have more than one affinity, and, being quite as much inclined to iodine as to hydrogen, will exchange one ally for another—sometimes with eagerness, occasionally with reluctance. The result of exchanging hydrogen for iodine in the methane molecule is to produce the antiseptic iodoform.

THE AMAZING VARIETY OF PRODUCTS OF THE CARBON COMPOUNDS

That example may be taken as typical of the long and ever increasing list of combinations which the chemist effects with the aid of acids and alkalies, and the affinities of elements among his compounds. He begins with methane, let us say, and changes and exchanges till he produces chloroform and iodoform. He can also make alcohol, and alcohol itself he can again convert. He can proceed from it to ether; and presently he will obtain sugars and glycerine. From methane and ethylene he proceeds to examine and juggle with the paraffins. On other lines of combination he comes on to the carbohydrates—glucose, fructose, the starches, and the coal-tar derivatives. Carbon compounds, in short, if they begin with coal, end with some of the most artificial products of civilization, from dyes to scents, from drugs to photographic materials, and from foods to artificial silk!

The work of the chemist is becoming increasingly important in the life of today. To his knowledge, skill and perseverance we owe much, and he tells us that what he has done is only a beginning—that still greater wonders may be expected in the near future.

THE NEXT STORY OF THE EARTH IS ON PAGE 4529.



In the shadow of Vesuvius.

ITALY AND ITS STORY

WE have seen in the last chapter the rise and fall in power of the old Roman Empire.

In compactness and completeness that empire has not had a rival. Though the British Empire is greater, more varied and more populous, it does not dwarf the rest of the world as the Roman Empire dwarfed it. Rome, in the days of her greatest glory, was mistress of the known civilized world, magnificent in her grandeur and irresistible in her might. She gathered the world around her into one vast unity over which her law reigned. Unity was her proud watchword, and Rome was the heart of that noble unity, with Italy spread around her as her chief support.

Yet, when the power of Rome was shattered, Italy, the most naturally compact of all countries, became the most divided, weakened and paralyzed. More than fifteen hundred years passed before Italy again became united and free.

The Roman Empire had been divided into eastern and western parts, with the eastern part leaning on Constantinople as its most powerful section, before the wild hordes of northern Goths poured down on it through the Alpine passes. It was the need for the defense

CONTINUED FROM 4180



Victor Emmanuel III.

of Italy against these rude and fierce invaders that called the disciplined legions homeward from such outlying parts of the empire as Britain. That recall was made in vain. Rome fell, and with her fall Italy was shattered into fragments.

The first invaders that came to stay and that set their mark permanently on northern Italy were the Lombards, a German tribe which, in its early onrush, swept southward to the limits of the peninsula, but finally settled in the fertile plain of the river Po, with Pavia as their capital.

Strange, indeed, are the changes of history. These fair-haired Lombards, who spread terror through Italy when they descended into its northern plain, remained to be, centuries afterward, a prosperous commercial people, famous for their management of money in business throughout Europe. To this day, in London the centre of the great financial district and the site of great banks is known as Lombard Street.

But the Lombards had to live through many generations of warfare before they understood the power of money. By the time they had gained a firm footing in Italy, the failing military power of Rome had been replaced

by the spiritual power of the Christian faith. Races unconquered by the legions of the Roman Empire had been converted by the Western Church, which acknowledged the pope of Rome as its head, so tribes from far outside Italy were ready to respond to the call of their religious chief to defend the city where he lived and had begun to rule. Men hoped they might have kinder treatment under the rule of a Christian bishop than under the rude kings of warlike tribes; and so it came about that around Rome the pope became trusted with earthly power as well as the spiritual power of religion, and popes took an active part in the wars which for centuries surged through Italy.

In this way in the ninth century Charlemagne, the great king of the Franks, a German tribe which had become strong in what is now southern Germany and France, crossed over into Italy, defeated the Lombards, and was crowned by the pope as emperor of a new state called, because of its association with Christianity, the Holy Roman Empire.

THE NORMANS WHO WENT TO ITALY WHEN THE CONQUEROR CAME TO ENGLAND

These emperors of the Holy Roman Empire, however, did not make Italy the centre of their rule, and bring to it peace and unity. They were not Italians. They liked the high-sounding name of emperor, and to be associated with the ancient fame of Rome, but they were really foreigners from beyond the Alps. Their chief interest was in their own countries. Besides, other races invaded Italy from time to time, and small kingdoms and dukedoms were established in different parts of the peninsula. The Normans, about the time of the Norman Conquest of England, sailed in bands to southern Italy and seized Sicily and part of the southern mainland and reigned there.

The popes, too, as they increased their territory, did not always agree with the emperors, who were comparative strangers, and so the country was broken up into separate states, waging frequent wars and forming alliances with or against each other. Thus the rival claims of ambitious rulers at last drove out of all minds the idea of an Italy united and prosperous through peace.

Another remarkable feature was the rise of energetic and prosperous cities, which became wealthy and famous, and so strong that they were able to be inde-

pendent of kings and ruling dukes. Each city developed a character of its own. Business rivalry led to jealousies and to war between city and city.

One bad effect of this division and rivalry was that when foreign invasions took place, there was no united attempt to repel the intruders. The Saracens, Arab wanderers from the African shores, came in strong force, and at times held the mastery over the Mediterranean Sea. Hungarian invasions from the north were repelled with difficulty, and Turkey, obeying the Mohammedan impulse toward war, successfully invaded Sicily. France, Austria and Spain laid claim in turn to parts of the country, leading to more wars and greater disunion. Italy as Italy had then no existence.

THE IMMORTAL DANTE AS THE FOUNDER OF THE UNITY OF HIS COUNTRY

Even the language of different parts developed differently, and the Lombard of the north, the Tuscan of central Italy, the Ligurian of the west around Genoa, the Neapolitan of Naples and the Sicilian could with difficulty understand each other's dialect. It is not easy to see how the unity lost when the ancient Roman Empire collapsed would ever have been regained had it not been that one of the world's greatest poets, Dante, chose the language of Tuscany for poems of such beauty and attractiveness that he interested all men, and fixed forever a literary standard for every part of the disunited country. The ordinary speech of Italy to this day is widely different from the language in which books are written. Dante was the real founder of Italian unity. Not only did he make it possible by establishing a common language of which all were proud, but he was a patriot whose writings were a call to unity. For many years he lived in exile, as we read on page 6150.

THE EVERLASTING GLORIES OF A NATION'S TROUBLED YEARS

One of the most striking things in Italian history is the fact that the period of the greatest disunion produced the glories which give Italy a position in the modern world not unworthy of the successor to ancient Rome.

The government of the peninsula was at its lowest ebb, with tyranny everywhere, and war scarcely ever absent, in the days when all the really great works in Italian literature were produced. It

QUIET PLACES IN A LOVELY LAND



By the waters of Lake Como, one of the most beautiful lakes in Lombardy, Virgil and Claudian celebrated its glories; the two Plinys were born there. Bellagio with its splendid villas is a lovely spot.



A vineyard in the shadow of the snow-covered Alps. In Italy the vines are trained higher than in France. Photos, Donald McLeish.



A convent orchard near Lake Como which, lying due north of Milan, is formed by the river Adda.

was the same when she was painting the pictures and building the cathedrals and palaces that are now a delight to all the world. She was also leading the way to the rescue of the fast-fading literature of classical Greece, and the revival of a delight in the learning that preserves much of the world's finest thought.

There was even some advantage in those days in Italian local jealousies and continual petty warfare. When a man dared to think for himself in politics, learning or religion, he was apt to come up against those holding power, and no man knew when, if he called his soul his own, he might not find it convenient to flee for his life to some near-by place of refuge. Almost every great Italian in the Middle Ages and later was from time to time a fugitive and exile. Originality of thought might have been stamped out had there been fewer places of safety.

So ever present were jealousy, rivalry and hostility between state and state, city and city, king and king, and duke and duke, that the rejected of one place would be certain to be the accepted of some neighboring place. The persecuted had but to cross a state's frontier or a grandee's boundary and he would be welcomed by the persecutor's enemy.

THE LITTLE STATES AND THEIR RIVALRY IN WAR AND IN ART

The spirit of conflict was by no means personal only, or a family feud. Whole communities were involved in keen rivalries. Genoa, the home of adventurous seamen, including the greatest of them all, Christopher Columbus, fought fiercely for supremacy on the sea against wealthy Venice, when she sought to capture the carrying trade of the eastern Mediterranean. Pisa and Leghorn were keen in competition, while they neglected the pirates who infested their shores.

Happily there were other forms of competition than war and trade. The towns of Italy vied with each other in the beauty of their cathedrals, their painting and sculpture, so that to this day no considerable town that has existed since the revival of art and learning can be neglected by the student of art.

While Rome was the centre toward which the finest artists were drawn, it was not a place where art began. Florence was first among a number of cities, as the intellectual and artistic inspirer of the Italian people. It was the city of

Dante and Giotto, of Michelangelo and Leonardo da Vinci; and in it the most celebrated of Italian ruling families, the Medici, had their home, the wealthy patrons of art and learning for centuries.

With such intellectual progress and refined taste giving Italy a distinction in the world which ancient Rome had never attained—though it had other distinctions as important—how came it that the peninsula for so long remained disunited?

THE INFLUENCES AT WORK AGAINST THE UNITY OF THE ITALIAN STATES

Three influences delayed the unity which later seemed so natural, and which, indeed, is strongly suggested by the shape of the country within its surrounding seas and mountain ranges. The strength of local feeling in proud cities like Florence, Venice, Genoa and Milan tended to keep them independent. Racial differences in Piedmont and Lombardy in the north, Tuscany in central Italy, and Naples and Sicily in the south, were not readily overcome; and the Papal States, acting as a wedge between north and south, made unity impossible.

There was natural reluctance to interfere with the temporal power of the pope in the regions around Rome, supported, as it was, by the religious faith of Roman Catholic lands outside Italy. And, as time went on, pressure from powerful military nations beyond the Alps made movements for national freedom desperate ventures. Austria, overrunning Venice and the lands behind, which gave it timber for foundations and shipping, and passing through the Brenner Pass to the northern Italian plain, long gripped north Italy in a military stranglehold.

So much was this the case that when Napoleon, in fighting Austrian opposition to the French Revolution, descended through the Alps and routed the Austrians in the north, he was received as a deliverer. After establishing a republic beyond the Alps, he was eventually crowned in Milan Cathedral as king of Italy, and he received, until his downfall, loyal support from those who had groaned under Austrian tyranny.

Though Napoleon imposed his will on Italy in a manner that we cannot excuse, there is no doubt that his use of his power over the peninsula tended to smooth the way toward national unity. For instance, he brought southern Italy into closer touch with the rest of the country. No

ITALY'S GREAT STRUGGLE FOR UNITY



With their country split up into many badly governed states, the people of Italy longed to be a united nation. All agreed that the first step was to drive the Austrians out of Italy, and several unsuccessful attempts were made. In 1859 Sardinia, with the help of France, defeated the Austrians at Palestro.



Four days after the battle of Palestro the Austrians were again severely beaten at Magenta by the French, and the emperor Napoleon III, with the king of Sardinia, made a triumphal entry into Milan.



The success of Sardinia roused enthusiasm all over Italy, and the demand for unity became universal. The Austrians again suffered defeat at Solferino, and Napoleon was acclaimed victor on the battlefield, as shown here. But he became jealous of Sardinia, made peace with Austria, and fought to prevent the Italians taking Rome. It was not till 1870 that Italy really became a nation, with Rome as its capital.

part of the peninsula had been quite so badly governed as Naples and Sicily. It had passed from Norman kings to German emperors, to French, Spanish and Austrian royal houses. It had been neglected and oppressed, and left in a state of ignorance, superstition and brigandage. It was Italian only in name.

THE THOUGHTS OF FREEDOM THAT ENTERED THE MINDS OF THE PEOPLE

Napoleon linked the south with the rest of Italy, and at last, when Napoleonism faded out, it left behind in Naples a desire to be really united with the rest of Italy. Hope was specially strong in the vigorous north, where the Italian royal house of Savoy, ruling in Sardinia and the State of Piedmont around Turin, was gathering strength. There were insurrections in Austrian Lombardy, Venice and Rome, but Austria tightened her hold on her Italian possessions, and France became protector of the papal power in Rome. All the free countries and free minds in Europe, however, were being won over to an interest in Italian freedom. What right had any country outside of the peninsula to deny to the Italian people the liberty they craved? England was especially sympathetic. The story of the freeing of Italy is one of the most thrilling that can be written. The pope fled in disguise from Rome on the box of a carriage; the citizens of Venice took shelter round St. Mark's against Austrian cannon; Louis Napoleon of France helped and hindered, and took Savoy and Nice for his pay; Garibaldi freed Naples and Sicily from the tyrant who bombarded Messina and Palermo and caused his own people to be shot down in the streets. When Victor Emmanuel entered Rome in state on July 2, 1871, he received an enthusiastic welcome; but the pope shut himself up in his palace; and all popes ever since have refused to leave the Vatican.

GARIBALDI RETURNS FROM SOUTH AMERICA TO SET HIS COUNTRY FREE

Five men brought about the change. These were Victor Emmanuel, king of Piedmont and Sardinia; his chief minister, Cavour; Mazzini, the famous political thinker and writer, who had a powerful effect on public opinion; and the great Garibaldi, a brave and daring adventurer who had won fame as a soldier in South America, and then came to Europe to devote his life to securing the unity and freedom of his own country,

Italy. We may read more of them on page 4588. The fifth was Napoleon III.

The Sardinian king and people had gained the good-will of England and France by joining them as an ally in the Crimean War. Napoleon thought he saw an opportunity of imitating his famous uncle by taking up the cause of Italy and driving out the Austrians from its northern provinces. For Piedmont alone this was an impossible task. But Napoleon agreed with Count Cavour that two hundred thousand French soldiers would assist in a campaign against the Austrians if the Italian provinces of Nice and Savoy were ceded to France. The Austrians were defeated in 1859 at the battles of Magenta and Solferino, and in consequence Lombardy was annexed to Piedmont. Tuscany also joined Victor Emmanuel's kingdom. France received Nice, Garibaldi's birthplace, and Savoy, the home of the ruling house of Italy.

THE END OF THE STRUGGLE FOR THE UNITY OF THE ITALIAN RACE

Garibaldi, who had fought bravely against the Austrians on the slopes of the eastern Alps, now proceeded to raise rebellions in various parts of unredeemed Italy. He invaded Sicily, and crossing to the mainland, captured Naples, which he handed over to Victor Emmanuel. In this way all Italy except Rome and Venice became united, with Victor Emmanuel as king. Venice was regained by Italy from Austria through an alliance with Prussia in 1866; and Rome was occupied when the French troops were withdrawn from the city in the course of the Franco-Prussian War of 1870. During these changes, which nearly completed the unity of Italy, the capital cities had been: first Turin, when Piedmont was taking the lead; then Florence, after the gain of Tuscany; and finally Rome, which thus became once more the centre of government.

But all the Italians were not united. In the valleys which run northward into the Alps, such as the broad tract called the Trentino, which leads up to the Brenner highway into Tyrol, were populations chiefly Italian, but still under Austrian rule. The defeat of Austria in the World War led to these mountain people, in many valleys, right up to the watershed of the eastern Alps, being given to Italy; and so, from the Alpine ridges to Sicily, Italy became at last united and free.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 4565.

BEAUTIFUL NAPLES AND BUSY GENOA



No city is more picturesquely situated than Naples, standing, as it does, by the blue waters of the Mediterranean, with the threatening crater of Vesuvius frowning upon it, and belching out clouds of smoke as though to remind the people of the fate of Pompeii, close by. But Naples is not only beautiful: it is a great centre of trade, an important naval and military station, and the largest city of modern Italy.



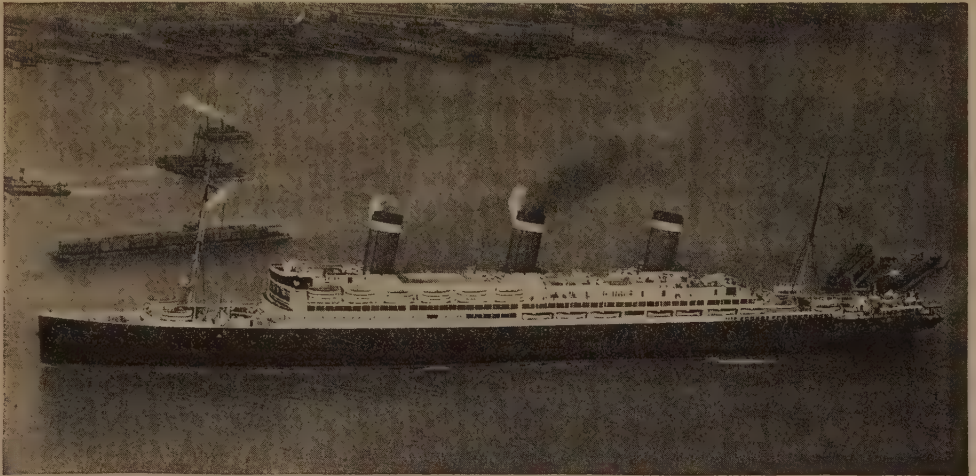
Viewed from the sea, Genoa seems to merit its name of "Genoa the Superb." But a closer view does not confirm this impression, for the city is not really beautiful. Although it has some fine churches and palaces, the city is built awkwardly and consists of narrow, irregular streets. It is, however, the greatest commercial seaport in Italy and does a large trade. Genoa is famous as the birthplace of Columbus.

THREE OCEAN QUEENS



Photo, courtesy of the United American Lines.

THE RESOLUTE OF THE UNITED AMERICAN LINES



© Hamilton Maxwell, from Kadel & Herbert.

THE LEVIATHAN OF THE UNITED STATES LINES



Photo, courtesy of the Canadian Pacific Railway.

THE EMPRESS OF SCOTLAND OF THE CANADIAN PACIFIC FLEET

The Book of Familiar Things



Tugs bringing the Mauretania into harbor.

A GREAT SHIP AND WHAT IT CAN DO

A SHIP is perhaps the most complete example of modern civilization. Her engines, her internal communications, her wireless, her refrigerators, her electricity, her ventilating systems, and her multitude of other wonders make a picture of modern life.

Life afloat was revolutionized when steam took the place of sails, and when iron and steel were introduced into shipbuilding instead of wood. Perhaps the most remarkable and far-reaching features of modern life afloat are those that have come from discoveries and improvements in electricity and wireless. A ship may well be compared to a compact, well-regulated, well-equipped, self-contained town floating on the sea.

All available space in this little town is crammed with the wonder of science and invention. There is no overlapping, no unnecessary equipment, no useless lumber. Everything is there for a specific purpose, to insure the efficiency of the vessel and the comfort and welfare of those who sail in her.

Let us think of a large liner leaving port for a voyage. A ship leaving London, say, for Australia, will steam between twenty and thirty thousand miles, through every type of wind, temperature, sea and weather, before she is back home. She will carry

CONTINUED FROM 4300

every type of human being as passengers. You will see walking about

in this little traveling town the statesman, the millionaire, the doctor, the lawyer, the soldier, the commercial traveler, the emigrant, the business man, the tourist, the explorer, the professor, the politician, the author; every type of man, woman and child in every walk and profession of life.

All these lives must be maintained, fed and housed, and their general welfare must be insured. The necessary food supply is in itself a great example of modern methods and improvements.

In the old days salted or canned food was the mainstay of supply. Now all the ships are fitted with huge refrigerators, in which food of every imaginable variety is stored and kept sweet and fresh until it is brought out day by day for meals. Even fresh milk can be kept in this way. It is put into the refrigerator and frozen into solid blocks, and when milk is wanted, a piece is broken off and thawed. Powdered milk is also used on some ships, and by means of an apparatus which the ship's crew loves to call the Iron Cow, fresh milk is obtained with the addition of warm water. Thus it is perfectly practicable to have fresh milk on the Equator even if the ship has been days or weeks at sea.

The water supply of a ship is another problem. Sea-water is sucked up into the vessel by powerful pumps for washing purposes, baths and the general cleaning of the ship. When in harbor large tanks in various parts of the ship are filled with fresh water for drinking and cooking purposes. On a very long voyage, however, these tanks are not enough for all needs, and fresh water has to be obtained by other methods. There is a wonderful invention called the evaporator, by which the sea-water is actually turned into good fresh drinking water. The inside of the evaporator contains a number of small tubes through which steam passes from the boilers. When the cold salt water comes into contact with these hot tubes, vapor rises and is led into a condenser. There it is condensed into pure fresh water. The salt remains in the evaporator and can be blown out of it overboard by jets of steam, though this is troublesome.

A HUNDRED YEARS OF AMAZING PROGRESS AT SEA

When we think of the size and speed of our modern ships, we realize that tremendously powerful engines are required to drive them. It is interesting to trace the developments which have taken place in a ship's engine-room. The earliest ship to be propelled by steam had one paddle wheel astern, and this was driven by a steam engine of about 80 horse power. One of the last of the ocean-going paddle-ships was 379 feet long, with engines of about 4,000 horse power.

The screw-propeller, brought into use about 1836, has practically driven the paddle wheel off the sea.

It is now used almost entirely to drive ships. Some of the huge liners of to-day have a displacement of 60,000 tons. They are propelled by three screws with a total horse power of over 50,000. We can see the enormous strides made in marine engineering in a century.

Up to our own time the reciprocating engine was fitted to all the liners of the world, and great perfection was attained with it. A reciprocating engine is one in which a piston slides to and fro. Turbine machinery in various forms has now, however, become common on ships of the mercantile marine. In some war vessels also it has displaced the reciprocating engine. Some ships use the electric drive. This means that the engines drive

huge dynamos and produce electricity which drives the propeller-shaft.

The ill-fated *Lusitania*, the great liner sunk in the war, had four screws, and a total horse power of 70,000. Some of the ships built since the World War have even greater power. The boilers, which are now usually of the water-tube type, have to supply the huge volume of steam required for these enormous powers. Allowing roughly 15 pounds of steam an hour for every horse power, the immense quantity of 500 tons of water is converted into steam every hour for use in the main engines.

WHY OIL IS BETTER THAN COAL AS A FUEL FOR SHIPS

Oil is now taking the place of coal for use as fuel. It has the advantage of being more cleanly in use and easier to handle. Replenishing the ship with coal has generally been a lengthy business, involving much labor and difficulty. Oil is now pumped into tanks in the ship through hose-pipes.

Think of the tremendous heat generated by the furnaces in raising the steam to drive the ship. Except for a most perfect system of ventilation the ship's atmosphere would become unbearable. However, throughout the length and breadth of the ship are huge ventilating shafts, and huge electric fans are always pumping air into the inner recesses of her complicated structure. Electricity plays a great part in the general life, comfort and efficiency of the ship. The ship provides her own electricity through dynamos which in a big ship generate power for a thousand and one things.

THE BIG PART ELECTRICITY PLAYS IN THE LIFE OF THE SHIP

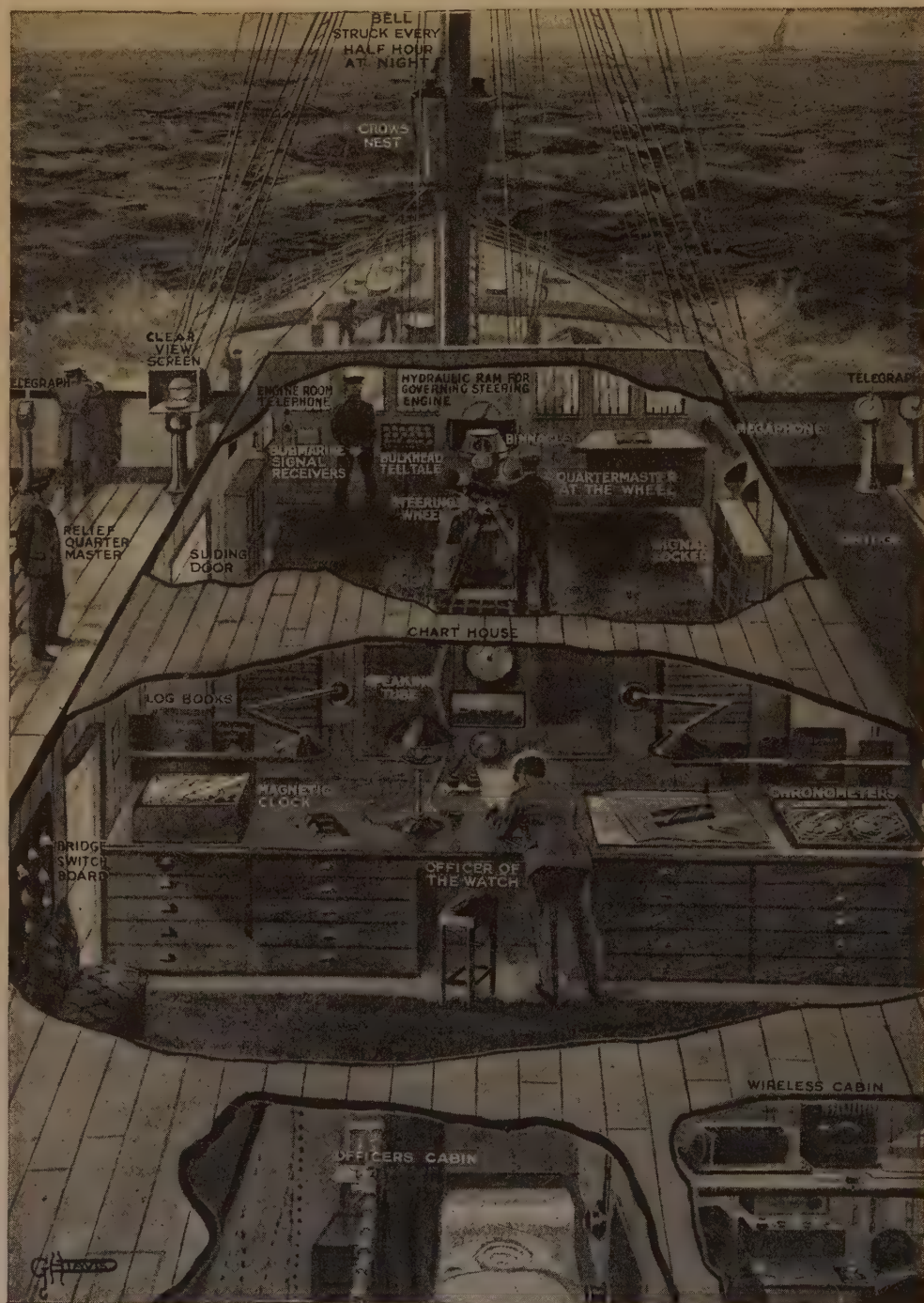
A big ship is always lighted throughout with electric light, and electric fans are placed in the cabins and saloons to stir the air when she is steaming in hot weather, while electric radiators are fitted for use in cold weather. The large white, red and green navigation lights carried by a ship—to show her type and the direction in which she is steaming—are all electrical. In some big ships the large derricks for hoisting the cargo, boats or other heavy material are also worked by electricity. If a ship carries a searchlight, this again requires electricity, as do also the smaller arc lights we often see hanging up over a ship's hold when she is taking in or discharging cargo.

THE DUMMY FUNNEL OF A GREAT SHIP



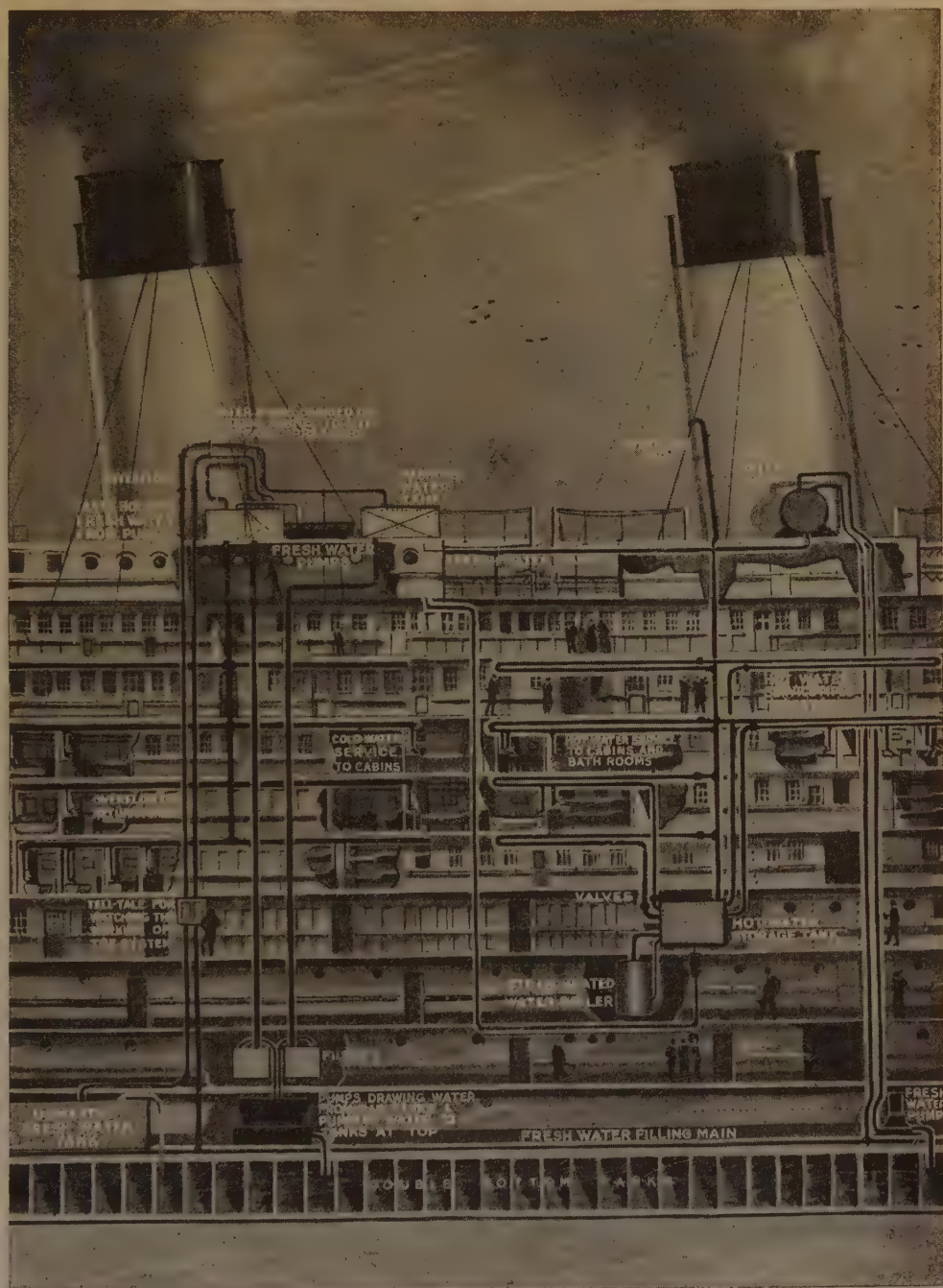
On some of the great Atlantic liners one of the funnels is not used for carrying off the smoke of the furnaces, but is a dummy funnel used for a variety of purposes. The Majestic and Olympic of the White Star Line, the Berengaria of the Cunard Line, and the American liner Leviathan all have a dummy funnel, which is the stack nearest to the stern. This picture, which gives a section through a liner, shows the uses to which the dummy funnel is put. Its chief use is for ventilation. Odors from the galley, as the kitchen is called, also pass up this funnel, and through another pipe a fan draws out the inflammable gases that escape from the oil tanks. Ladders are inside the dummy funnel for the ship's attendants to go up when necessary for cleaning purposes or for repairs.

THE POWER INSIDE A SHIP



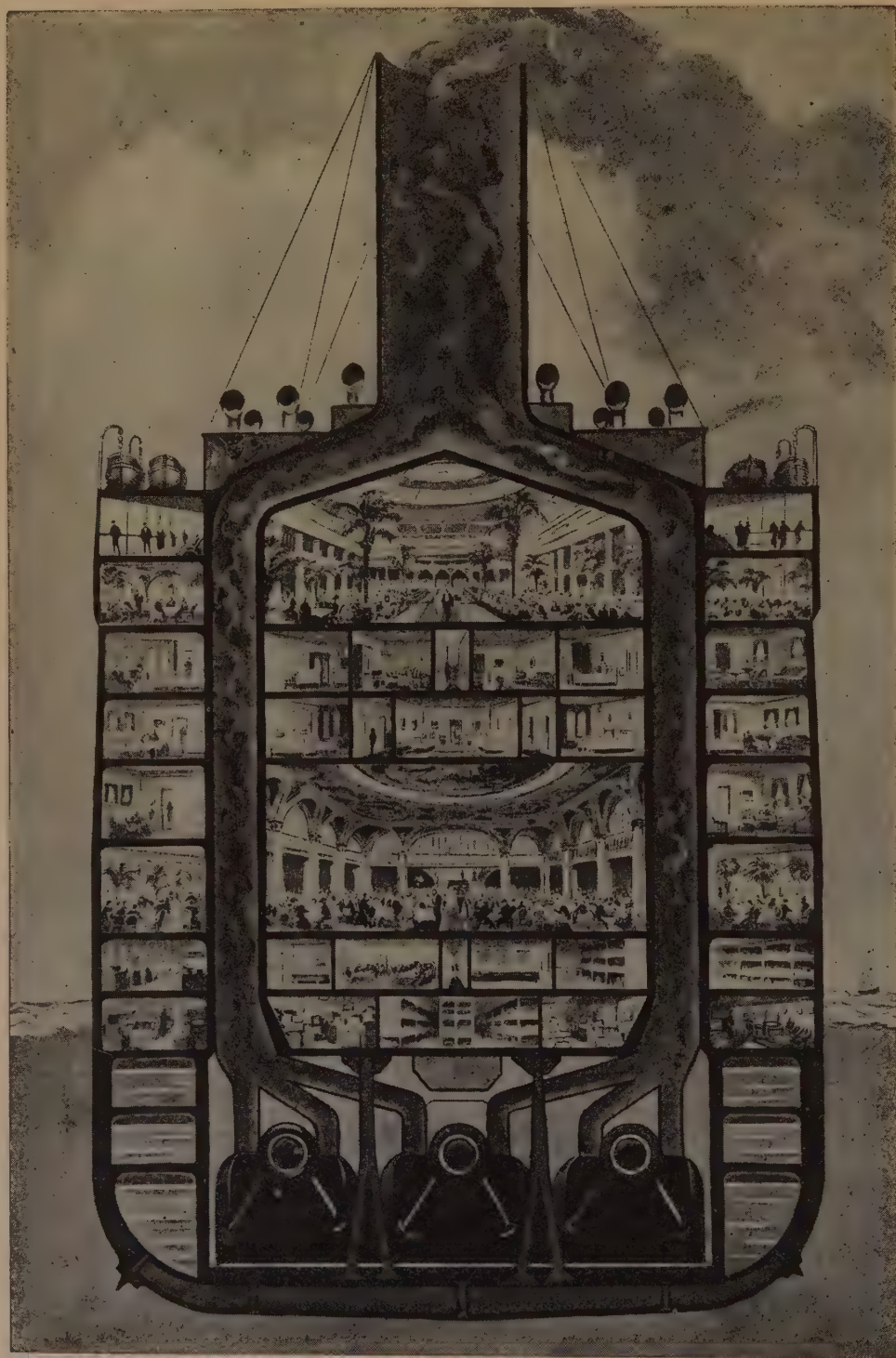
The directing power of a giant liner is in the bridge, where the captain stands. He is able to communicate with every part of the vessel. In the wheelhouse are the compass and steering-wheel, with telephones to the engine-room; and adjoining are the chart-house, the captain's cabin, and the wireless cabin. The captain is like a speck on his gigantic ship, yet by a touch of his finger he can change its direction or bring it to a stop.

THE WATERWORKS OF A GIANT LINER



An enormous amount of fresh water is needed for the voyage of a great liner, and this water is not usually distilled from the sea during the journey, but is taken on board while the ship is in port. Hot and cold water are carried to all parts of the ship, and this picture gives some idea of the complicated system of pipes and pumps, valves and tanks that is necessary. On the left-hand side the cold fresh water system only is shown, and on the right-hand side the hot-water system; but both systems are fitted in all parts of the ship. The liner has also its own distilling plant, so that at any time fresh water can be distilled from the sea. This is costly to use, however, as it involves constant cleaning and repair, owing to the clogging salts in the sea-water.

INSIDE THE GREAT SMOKE STACK



The White Star steamship Majestic and the United States liner Leviathan have their stacks divided so that they pass up the sides instead of up the middle, thus increasing the spaciousness of the saloons.

THE WIRELESS BRIDGE THAT KEEPS A SHIP IN TOUCH WITH LAND

Then, a ship must have electricity to be able to use its wireless. Practically every ship now carries wireless, and its importance to the ship is tremendous. She can use it to signal her position. When approaching a harbor she can use it to make arrangement as to berthing, and by wireless she informs her owners and the harbor authorities of the exact time she is due to arrive. She can also wireless her orders for whatever coal, oil, water and provisions she needs on her arrival so that they will be awaiting her. Should she be in danger or broken down or disabled, she can send out distress signals, with her exact position in latitude and longitude. All ships in her vicinity will know at once if they are within a range in which they can give effective help.

There is another wonderful wireless invention, of which it is almost impossible to overestimate the future importance. Stations are dotted over various parts of the world, and by a special detecting instrument are able to tell the exact bearing or direction of a ship which sends a wireless message to them. This bearing they signal to her. A ship therefore knows that she is in a certain line of direction from a particular station. Should another station be within range at the same time, she would get two lines of direction. The point where these two lines meet on her chart would be the ship's actual position.

A ship is able to fix her position by this method in cloudy weather when no stars are visible, or even in a fog. We can look forward to the day when these direction-giving stations will be established on all dangerous headlands, so that the great anxiety and danger always present in a fog will be considerably lessened.

NEWSPAPERS THAT TELL THE WORLD'S STORY IN MID-OCEAN

Day by day, night by night, the ship's wireless brings in the news of the universe. Throughout a long voyage the passengers are able to learn the leading events taking place in the world. On the smaller ships copies of these news bulletins are placed on the bulletin boards, but in the very big ships there is a printing and publishing office, and a daily newspaper is produced.

Some of our newspapers now publish weather charts of the world. These observations are made partly by ships in various parts of the ocean. The barometer, thermometer, wind, and general weather conditions are observed at particular times, and the ship's wireless soon sends this information to the Meteorological Office. So a ship which is itself full of scientific meteorological instruments is able, in a most wonderful and efficient way, to help forward scientific research.

WHY A GREAT SHIP IS LIKE A GREAT MAGNET

All great ships carry a number of delicate and important instruments, first among them the compass. This, of course, is an absolute essential to all vessels at sea. Every ship carries one, and large ships carry many, fixed in different parts of the vessel. Generally a card is graduated round the rim of the compass in degrees from 0 to 360, and beneath the card are small long-shaped magnets. These magnets, which are fixed in line with the North and South points, would, on shore, point to the magnetic North, but on board ship there are many difficulties to be overcome before you can obtain an accurate compass. It is rather amazing, but true, that a ship itself is one large magnet. Let us see why.

All the main parts of a modern ship are built of steel. During the process of building, the vessel lies for the greater part of the time in one direction. All this time she is being hammered and riveted, and her beams and frames are being forced into position. If we take an ordinary steel bar and hammer it hard, the bar turns into a magnet, and exactly the same thing happens to the main steel hull and structures of a ship while she is being built. A ship, therefore, is like a mass of magnets, some vertical, some horizontal; and their effect is at once apparent on a compass placed in a ship. The stand on which a compass is placed is fitted with a number of holes into which artificial magnets can be fixed in such a way as to produce an effect on the compass exactly equal and opposite to that produced by the magnetism of the ship. This is necessary to navigation.

Strange as it may seem, in recent years a new compass has been invented

which is entirely independent of magnetism. This is called a gyro-compass, and it is being gradually introduced into ships. The general principle of a gyro-compass, on which the gyro-compass is based, is that a flywheel, spinning rapidly, tends to continue to point in the direction in which it is originally started. Electricity is used to effect the spinning of the flywheel, and the gyro-compass is set to point due north.

THE WONDERFUL COMPASS THAT POINTS TO TRUE NORTH

After many trials and experiments a gyro-compass has now been produced which for all practical purposes always points exactly north; and it will be of the greatest value to ships. When we consider the errors and variations to which a magnetic compass is liable, we can appreciate what modern science has done to insure a ship's keeping a steady course.

The next important thing for a ship to know is how fast she is traveling, so that the captain may be able to calculate the distance he has steamed. The latest invention for doing this consists of an apparatus attached to the bottom of the ship. It consists of a bronze tube open at both ends and placed in the line of the keel. As the ship moves forward the water flows freely through the tube, in the middle of which is a small propeller revolved by the action of the water flowing through the tube. The propeller is constructed to make a definite number of revolutions for every mile steamed.

Attached by gears to the propeller is a vertical shaft, which passes up through the bottom of the ship to a registering apparatus with a dial. This shows at any time the speed at which the ship is traveling, and also the full distance steamed through the water. This apparatus is only now being fitted to many ships, but the instrument in common use is worked on exactly the same principle.

HOW THEY FIND THE DEPTH OF WATER BENEATH A SHIP

Obtaining the exact depth of water under the ship is another very important business. In fog, when no land is visible, or at night, when no lights are in sight, it is sometimes the only guide as to whether a ship is getting too close to a dangerous shore. In former days the depth was always obtained by dropping

a heavy piece of lead over the side, and noting on a line the depth when the lead was felt to reach the bottom. Nowadays there are various contrivances to obtain the same result with much more accuracy. Nearly all of them are constructed on the basis that the pressure of water increases with the depth, and in all cases a heavy lead is used to sink the apparatus.

One type often used consists of a metal tube with a spring inside. As the lead descends, and the pressure increases, the spring is compressed. A pointer attached to the spring moves along a graduated scale, and so gives the depth. In another type a glass tube, open at one end and placed inside a brass guard, is lowered, with the open end downward, into the water. The inside of the tube is discolored by a special chemical preparation. As the lead descends, the water is forced up the tube, washing away the discoloration as it does so. By placing the tube against a scale and noting how far the water has entered the tube, the exact sounding can be obtained.

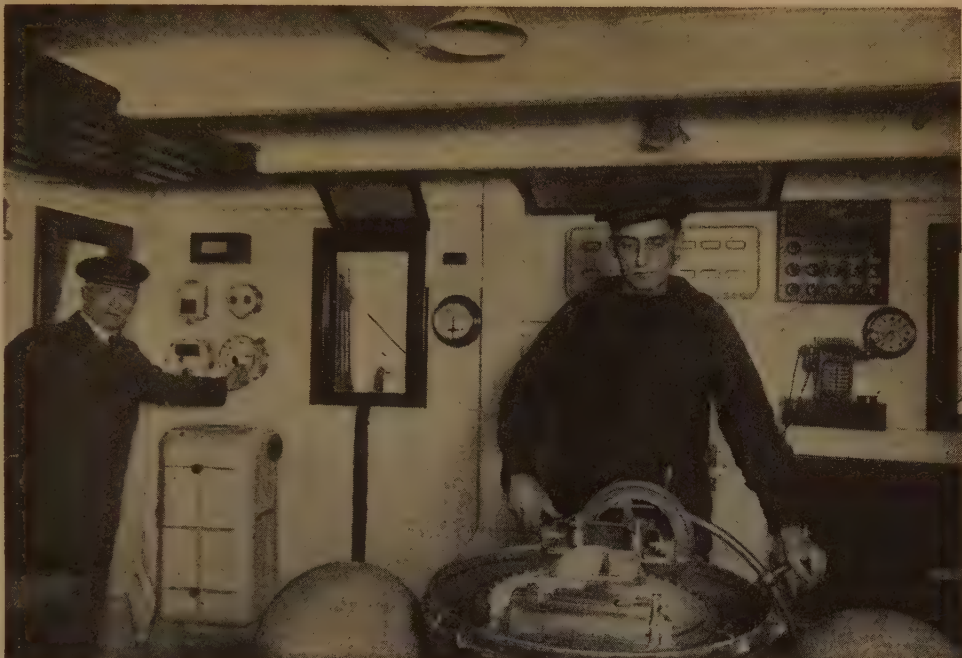
One great advantage of these instruments is that a ship can now continue at her ordinary speed. In the past she had to ease down or stop when taking her depth.

THE IMPORTANCE OF TIME TO A SHIP AT SEA

Accurate time is essential on board. The ship's position is frequently found at sea by observations of the sun, moon and stars, and in thus calculating the position the correct time is absolutely necessary. An error of four seconds in the time used produces an error of a mile in longitude.

It can be very well understood, therefore, that an ordinary clock or watch will not do for a ship. Special clocks, called chronometers, are made for ships. They are of the very finest workmanship and are most carefully tested. The metals used for the construction of a chronometer are specially treated to compensate the extremes of heat and cold which a ship is likely to encounter in a long voyage. When fixed on board, the chronometer is treated with the utmost care and consideration. It is wound at the same time by the same person every day. The hands are never altered, but the errors are calculated day by day according to the known rate they are gaining or losing. This error is applied

THE TOP AND BOTTOM OF A SHIP



The captain, on the left of the picture, is operating the levers which control all the water-tight doors on the ship.

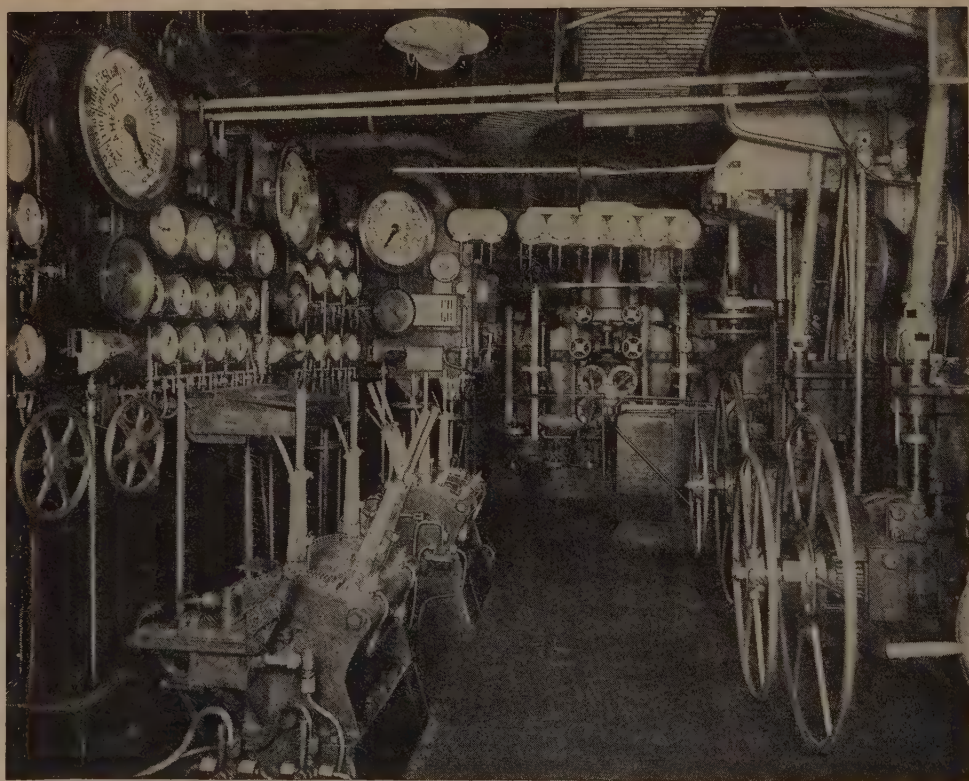


The great shaft which drives a propeller, showing a water-tight door.

THE CONTROL-ROOMS OF A GREAT SHIP



Control-room with the pumps which lubricate the engines in the Leviathan.



Control platform in the engine-room, where the captain's orders are received.

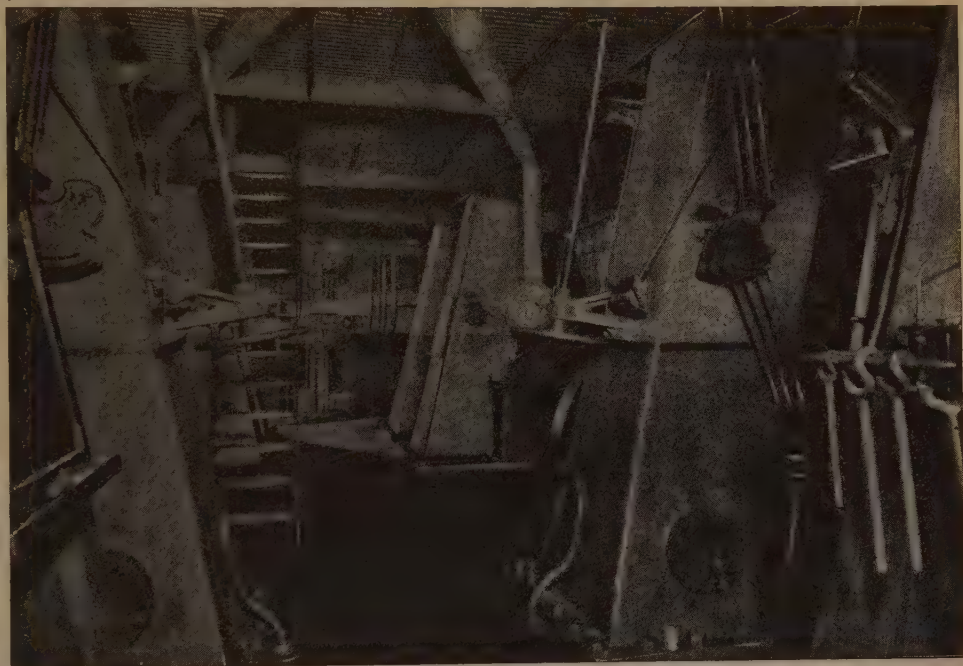
THE BRIDGES AND THE ENGINE-ROOMS



Navigating bridge of the Aquitania.



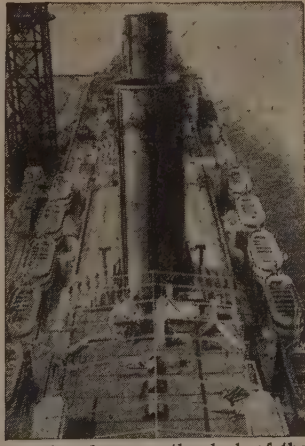
Bridge of the P. & O. liner Mongolia.



In the engine-room of the P. & O. steamship Narkunda.



Water-tight door between engine-room and stokehold.

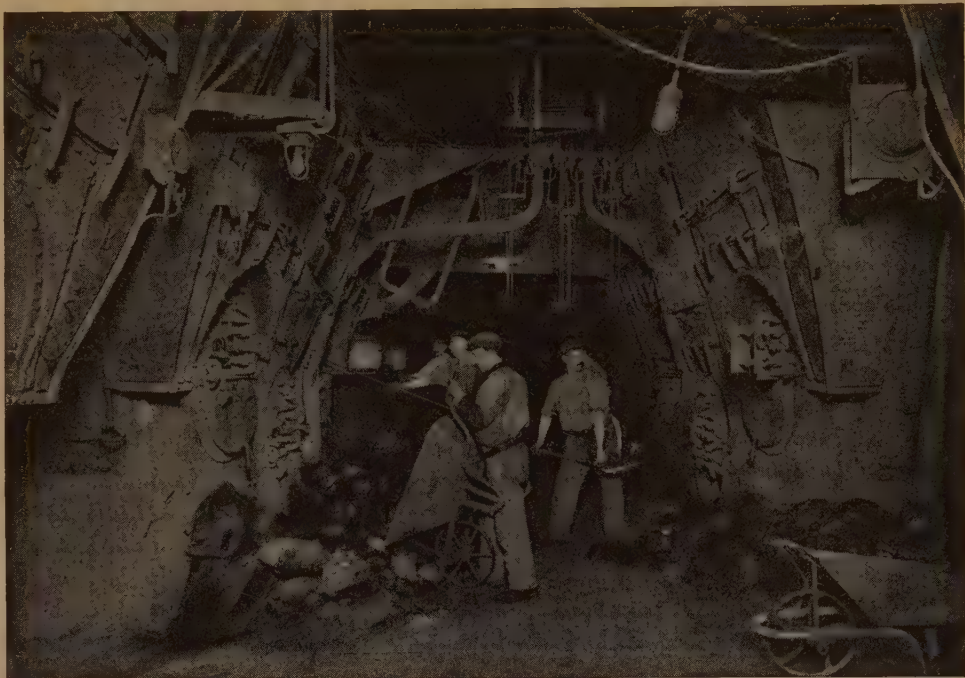


Looking down on the deck of the Leviathan.

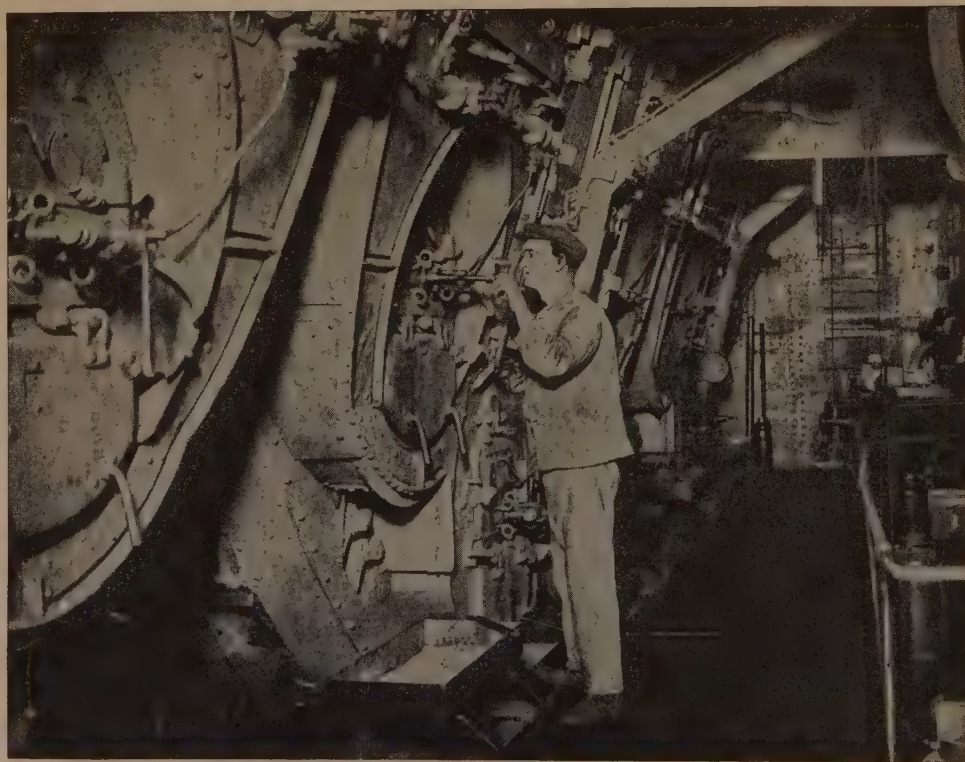


The cylinder tops in the engine-room of the Homeric.

THE COAL AGE AND THE OIL AGE



Stokers feeding the furnaces with coal, which is rapidly giving way to oil as a fuel.



The engineer of the oil-driven Aquitania regulating the flow of oil to the furnaces.

to the time as shown on the face of the clock. The real function of a chronometer on board a ship is not necessarily to keep absolutely *accurate* time: what it must do is to keep a *steady rate*, whether gaining or losing, so that its error is always accurately known and can be corrected. Before wireless was in use, ships were often weeks at sea without being able to check the errors of their chronometers, and were thus entirely dependent on their keeping a steady rate.

HOW THE SHIP HELPS TO FORECAST THE WEATHER ON LAND

Wireless stations scattered all over the world send out accurate time signals at frequent intervals, and a ship is seldom without the means of correcting her chronometers. Sometimes she may be out of reach of wireless signals, or her own apparatus may have broken down or been destroyed in a gale; and in such cases she is dependent for her position on her chronometers.

We have already considered the information a ship is able to give the meteorological stations. To be able to do this satisfactorily a ship has a number of finely made instruments. Mercurial barometers as well as aneroids are always carried, and thermometers are supplied for obtaining both air and sea temperatures. In addition to noting the readings of these instruments at definite times, the general weather direction, the force of the wind, and the state of the sea are observed by wireless.

Perhaps we may look at some of the precautions taken to insure the general safety of the ship. As every town has its fire engines ready to deal with fire, so a ship must be able to deal with the same danger. Running through the length and breadth of a ship are large water pipes, called fire mains. By means of very powerful pumps water can be circulated at high pressure through these pipes, which have many hose-pipe connections. By opening a valve a strong head of water can be obtained in any part of the ship.

WHY A GREAT SHIP IS DIVIDED INTO WATER-TIGHT COMPARTMENTS

A ship is divided into a number of water-tight compartments. A fire originating in any apartment can therefore be isolated. As fire cannot burn without air, the flames can be quickly extinguished if they are discovered early. The chief

use of water-tight compartments, however, is to increase the ability of a ship to remain floating if damaged by collision or by running aground. Unless a hole in a ship is very big, the inrush of water will be confined to the particular compartment that happens to be pierced, and this in itself is not sufficient to sink the ship.

With the ship thus divided up into compartments, it is necessary to have efficient and reliable methods of communication. In all big ships are telephones or speaking-tubes connecting all important places, and electric bells in all the cabins and apartments. For such an important matter as the communicating of orders from the bridge to the engine-room a mechanical contrivance called the engine-room telegraph is used. This consists of a dial on the bridge marked with varying degrees of speed. When the captain moves a pointer on the bridge to the required speed, a similar pointer on a dial in the engine-room moves automatically to the same position.

The chart-house, which is usually situated on the bridge of a ship, is of the greatest interest. In this little compartment are all the instruments, charts and diagrams actually in use for navigating the ship safely from port to port.

THE MAPS OF THE SEA THAT ARE CONSTANTLY BEING CHANGED

Every ship carries hundreds of charts, which are sea maps accurately surveyed and drawn. They show in detail all the depths of water, outstanding features ashore, trend of the coast-line, and the positions of all lighthouses, lightships, buoys, and any other aid to navigation. Ships carry charts for all the oceans they are likely to navigate, with larger scale plans of the coast-lines and harbors they are likely to enter. They also carry various books, in which more information is given than it is possible to engrave on a chart.

Alterations are always being made on the charts, and new information is constantly being added. New rocks are discovered; river mouths become silted up with sand; buoys break adrift; light-houses alter their lights, or new ones are built; ships founder and, lying in the fairway, become a danger to other ships; and a thousand other things have to be added on the charts. The department of the government which compiles and

keeps the charts up-to-date issues many notices a year, calling attention to changes, additions or corrections in existing charts.

In great liners the organization for the comfort, safety and amusement of the passengers is nothing short of marvelous. Games and sports of all kinds are held on the huge promenade decks, and some big ships have swimming-pools.

THE MAJESTIC, INTO WHICH 400 HOUSES COULD BE PACKED

To those who know nothing of life at sea, and even to many of those who do,

She is 956 feet long and has a displacement of 64,000 tons, while the Leviathan is 950 feet 7 inches long and has a displacement of 62,000 tons. Both ships are 100 feet broad. Both have turbine engines of 100,000 maximum horse power and both are oil-burners, able to carry 9,260 tons of oil.

In the Majestic there are 48 boilers and 240 furnaces, while the Leviathan has 46 boilers and 230 furnaces. Both liners have nine steel decks, and the space on board is equal to 400 eight-roomed houses. They have each over



THE DOMED LOUNGE ON THE CANADIAN PACIFIC LINER EMPRESS OF BRITAIN

the wonder of a great ship is incredible. If we examine the world's largest liners, the Majestic of the White Star Line and the Leviathan of the United States Shipping Board, we shall be astonished at their size and power. These great sister vessels were built in Germany between 1912 and 1914 and were named Bismarck and Vaterland respectively. As a result of the German defeat in the World War the Bismarck was awarded to England and the Vaterland to the United States. At once they were renamed Majestic and Leviathan.

Though they are sister ships, the Majestic is slightly the larger of the two.

1,200 rooms in which more than 4,000 people can live in addition to crews of over 1,000.

The Leviathan has 76 lifeboats, capable of accommodating more persons than ever are allowed on board of her at any one time. Besides, there are other life-saving devices, including life-preservers, with plenty to spare for all who make up the entire "ship's company."

The cubic space inclosed in the Majestic is about 5,000,000 feet. The dining saloon has an area of 10,000 square feet. There is a swimming-pool covering 820 square feet, into which 120 tons of warm sea-water can be put in less



Photo, Press Aid Department, United States Lines.
Lifeboats aboard the Leviathan.

than half an hour, and there are 30 dressing-rooms for bathers. There is a library with 4,000 books. On the Leviathan the equipment is practically the same.

The wonderful navigating system of the Leviathan includes a Sperry gyro-compass equipment. This non-magnetic, true north gyro-compass system of the Leviathan is the most complete gyro-compass system on any merchant vessel in the world.

These great ships carry anchors and cables weighing 230 tons, and the chain cables are nearly 4,000 feet long. When the ships are fully lighted up at night they have 15,000 glowing electric bulbs.

The ventilating system is one of the notable features of the ship, including 58 supply systems and 58 exhaust systems, besides circulating fans in refrigerating rooms and the two propeller fans for the battery-charging rooms. Nowhere in this ship where human beings usually eat, move around and sleep, is it possible for dead or bad air to accumulate. The mere turning of an easily accessible lever sets the ventilators going and thus keeps the air fresh and sweet.

The movements of the water-tight doors on the Majestic and the Leviathan are automatically announced by electric signals to the bridge. All her fireproof doors will resist a temperature of 2900° Fahrenheit, and whenever a certain

point of heat is reached in any compartment, the fact is announced automatically to the officer on watch. There is also a scientific device for detecting smoke. It consists of lines of pipes, from which air can be drawn and tested. There are 450 fire alarms and four separate wireless stations.

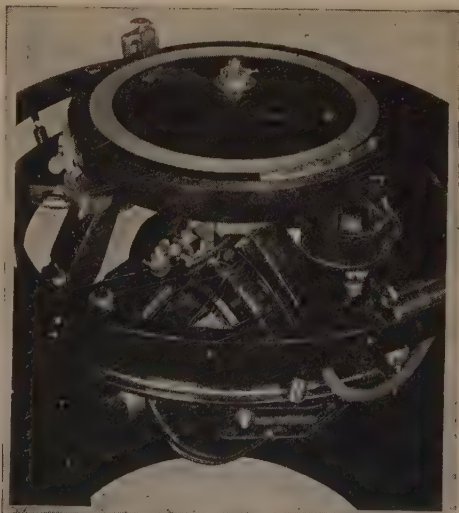
On the Leviathan, too, a thoroughly complete fire system has been installed. At the faintest suggestion of a fire in the remotest section of her hold, the danger is registered at the centre of the system. The simple turn of a hand on the fire-extinguisher machinery will put out a blaze at once.

THE PLATES MAKE A TOWER HIGHER THAN A STEEPLE

The stocking of such a ship for the Atlantic voyage is a huge task. The Majestic takes with her 48,000 eggs, 31,000 pounds of milk, 25,000 pounds of meat, 26,000 pounds of vegetables. She carries 17 tons of blankets, 3,000 mattresses, and 190,000 pieces of linen—enough to cover 50 acres. She has three tons of cutlery, and 75 tons of crockery and kitchen things; with 2,400 tea and coffee pots, 10,000 dishes, 16,000 cups, 29,000 pieces of glass and 55,000 pieces of silver and cutlery.

Restaurants, grill rooms and winter gardens have now been introduced into many big Atlantic liners, and general additions and improvements seem to develop with every new ship as she is built.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4533.



© Sperry Gyroscope Company.
The Sperry gyro-compass of the Leviathan.

THE SWIMMING-POOL OF A FLOATING TOWN



THE OPEN PROMENADE DECK ON THE ADRIATIC



THE SWIMMING-POOL ON THE MAJESTIC, RICHLY DECORATED WITH MARBLES AND MOSAICS

A GREAT SHIP'S DINING-ROOM



A DINING SALOON ON THE MAJESTIC

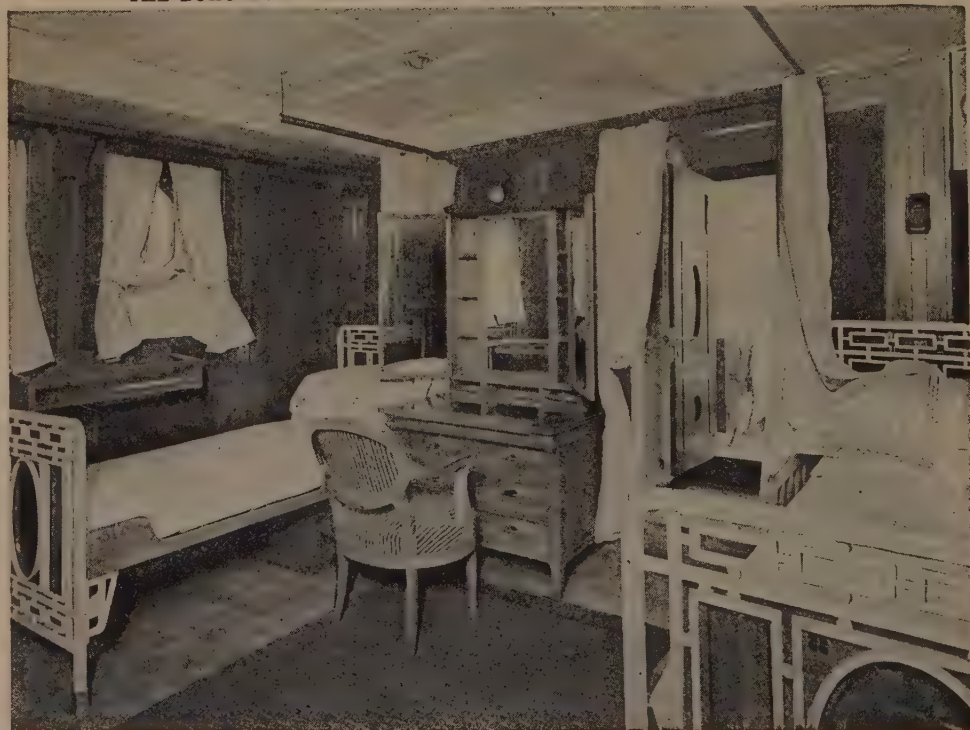


ONE OF THE INDOOR PROMENADES ON THE HOMERIC

ON BOARD A SEAGOING HOTEL



THE LUXURIOUS READING AND WRITING ROOM OF THE MAJESTIC



A BEDROOM OF A PALATIAL SHIP

THE HAPPY LIFE OF A SHIP



A golf lesson on deck.



In the pleasant nursery.



Play-deck for children on a great ocean liner.



In the well-equipped gymnasium.



A game of shuffleboard.

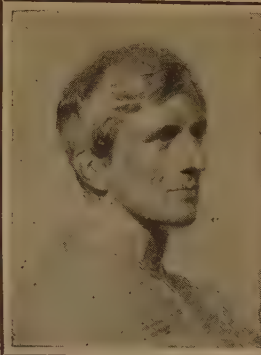
MILTON, ENGLAND'S GREAT POET, A MASTER OF HYMN-WRITING



Photo, permission of the Corcoran Gallery of Art, Washington.

Brought up in a home where music was a part of daily life, John Milton found it a source of refreshment all his life. Some of his earliest poetry is in the form of hymns—paraphrases of certain psalms. This picture, painted by Emanuel Leutze, shows the poet making music for Oliver Cromwell, Protector of England during the Commonwealth.

The Book of MEN AND WOMEN



LEAD, kindly light, amid the en-
circling gloom,
Lead Thou me on;
The night is dark, and I am far
from home,
Lead Thou me on.
Keep Thou my feet; I do not ask
to see
The distant scene; one step enough
for me.
I was not ever thus, nor prayed
that Thou
Shouldst lead me on;
I loved to choose and see my path;
but now

Lead Thou me on;
I loved the garish day, and, spite of
fears,
Pride ruled my will: remember not
past years.
So long Thy power hath blest me,
sure it still
Will lead me on,
O'er moor and fen, o'er crag and
torrent, till
The night is gone;
And with the morn those angel
faces smile,
Which I have loved long since, and
lost awhile.

Cardinal Newman and his famous hymn.

THE WRITERS OF THE HYMNS

WHAT is a hymn? The word comes to us from the Greek word *hymnos*, which means "song," generally a song of praise. And that is what a hymn is, or should be, to-day—a song of praise and thanksgiving. Hymns have done more than most men's words to bring comfort and joy to the hearts of people in sickness and sorrow, in doubt, danger and anxiety. Many lives have been saved in times of peril when some brave soul has raised a voice to sing a sweet, simple hymn. The others have listened to the appeal and have been comforted. They have gained confidence and have been prevented from rushing into a panic in which they might all have perished. The writers of hymns are therefore very important people in the history of the world. Many of them are more influential than they dream. One of our grand old hymns:

Let us, with a gladsome mind,
Praise the Lord, for He is kind,
was written by a boy! We have all sung it; millions of people have sung it during the last three hundred years. Yet how many of us have thought of it as the work of a boy? It was written by John Milton, the great poet, when he was only fifteen, studying at St. Paul's School.

CONTINUED FROM 4361



This hymn, though really old, seems almost young compared with some hymns sung every Sunday in every Christian land. The Jews sang hymns before Christ was born, and we still sing

hymns written in Greek or Latin by the saints. The hymn beginning "O Jesu, Lord of heavenly grace" was written by St. Ambrose, who lived his noble life fifteen centuries ago. A more famous hymn, "The day is past and over," is a translation from the Greek, in which it was written centuries ago by St. Anatolius. That grand hymn "Christian, dost thou see them?" was written far back in the ages by St. Andrew of Crete. We still sing three hymns by St. Bernard of Clairvaux, others by St. Gregory the Great, St. John Damascene, St. Joseph of the Studium, Francis Xavier, and many other holy men whose life-stories have come down to us through the ages. "We plough the fields and scatter," the harvest hymn, is from an old German author. "All people that on earth do dwell" was written so long ago that we are not certain that William Kethe, its supposed author, really did write it. The tune comes from a book printed in 1554.

All hymn-books ought to print the

names of the authors of the hymns. It is most interesting to know the name of the writer of some sacred song that we love. We think of the days and the place in which he wrote, and we understand the spirit in which he lifted up his heart. Take, for instance, that stirring hymn "Safe home, safe home in port," with Sir Arthur Sullivan's fine tune. We feel, as we sing the hymn, that these are the words of a man who lived in stirring times. And we are right, for the words are a translation from the Greek of St. Joseph of the Studium, who lived when Christianity was still struggling against the evil powers of the Roman Empire.

THE HYMNS THAT LED TO THE BIRTH OF THE PROTESTANT CHURCH

Martin Luther was a very great hymn-maker. He understood that the love of music, which the Jews had shown in their religious services, was not dead in men. He knew that to praise God in song was a natural desire of man, and he wrote hymns and chose tunes that would appeal to the heart and mind—tunes that were not so dull and unmusical as to be difficult and unpleasant to sing, nor yet of a character that would render them unfitting for religious services. "A mighty fortress is our God" is one of his best-known hymns.

The effect of Luther's hymns was marvelous. People wandered all over Europe singing them as they went. They were carried into the castle of the noble and into the cottage of the peasant. Songs have always had a great influence in exciting people to revolution, as we have seen in the history of many countries.

CHARLES WESLEY, WHO WROTE OVER SIX THOUSAND HYMNS

There are hundreds of thousands of hymns in existence, printed in hundreds of different books, and millions of these books are sold every year.

We owe a great debt for our hymns to the Wesley brothers. John Wesley, the founder of the Methodist Church in England in the eighteenth century, wrote many hymns and translated many more. But while John Wesley is famous for his preaching, it is Charles Wesley, his brother and disciple, who is remembered by his hymns. It is not always easy to say which were John's hymns and which were Charles's, but we know that Charles wrote about sixty-five hundred hymns.

No other man ever had such a record. Of course they are not all high-class poetry, but some of them are still among the noblest verses in the hymn-book. Take such of them as these: "Christ, whose glory fills the skies"; "Lo, He comes with clouds descending"; "Hark, the herald angels sing"; "The strife is o'er"; "Jesus, lover of my soul"; "O Love divine"—all the Christian world sings these. Charles was a great missionary, second only to his brother. He gave his life to religious works, and refused a great fortune because he did not think it right that the lady who proposed to leave it to him should forget her own family. He was born in 1707 and died when he was eighty-one.

DR. WATTS, THE INVALID SCHOOLMASTER WHOSE HYMNS WE ALL SING

In most hymn-books there are at least a dozen hymns by Dr. Isaac Watts. Many more might be included, and some others, not all so good, left out. He wrote over five hundred hymns, among them such treasures as: "When I survey the wondrous Cross"; "O God, our help in ages past"; "There is a land of pure delight"; and "Jesus shall reign where'er the sun." Watts was the son of a Southampton schoolmaster, and got his gift for poetry from his father. He became a tutor when he grew up, and then a minister, and received the degree of Doctor of Divinity from a Scottish university. He was taken ill when thirty-eight years old and went for a rest to the home of Sir Thomas Abney at Theobalds, which he never left till he died, thirty-six years later.

A more recent writer of favorite hymns was Bishop William Walsham How, who was born in 1823 and died at the age of seventy-four. Among favorites from his pen are "Summer suns are glowing," "We give Thee but Thine own," and "Who is this so weak and helpless?" It is natural to find preachers among the hymn-writers, but the result is that some of the hymns they write are not sung by all congregations.

Christian people do not all believe quite the same things, and as some hymns express views of only one Church, such hymns are sung only in that Church. John Mason Neale, a scholar and true poet, wrote some of the most beautiful hymns, but they are not generally sung. Still, some of them are for all the world,

such as: "O love, how deep, how broad"; "For thee, O dear, dear country"; "Jerusalem the golden"; and his translation from the Greek of "The day is past and over." Neale was a Church of England minister, very poor, but noble-hearted, though so extreme in his views that he got into trouble with his bishop and had to give up his pulpit.

The authors of some of the finest poetry in the English language are unknown, and we have many fine hymns that cannot be traced to their writers. We have some written as they first appeared in English; we have some from unknown German and Italian authors, and nearly fifty from unknown Latin authors. "Adeste Fideles," or "Come, all ye Faithful," is one of the most famous of the translations from the Latin. But of the man who first conceived those grand old words we know nothing. Even where the name of the man is known, and his hymns are world-famous, sometimes no record of his life is preserved. In any good hymn-book are found many of John Ellerton's hymns, among them "Saviour, again to Thy dear Name we raise," and the beautiful "The day Thou gavest, Lord, is ended." Yet not a word about his life is to be found in many of the great works which should tell us of such a man.

On the other hand, we know rather too much about Nahum Tate, the author of the immortal hymn "While shepherds watched their flocks by night." He lived in an age when it was not considered disgraceful to drink, and he was a drunkard. He was born the son of a Dublin clergyman, and became poet laureate of England. It is strange that such a man should have taken to writing poetry on sacred subjects. Yet it is only by his sacred writings that he is remembered! Perhaps it was his better nature that appeared in his hymns. He had a partner named Nicholas Brady, and together they produced a version of the Psalms which was long sung in many churches.

We find a brighter picture in the life of Bishop Reginald Heber, a more gifted poet than Tate, and author of "From Greenland's icy mountains," "Holy, Holy, Holy," and "The Son of God goes forth to war." Heber was born in 1783, and after he had left Cambridge University he had before him the chance of

an easy life as a country clergyman. But he scorned such an existence. He preferred the perils and anxieties of mission work in India, and ended his days as Bishop of Calcutta when only forty-three years old.

THE WOMEN WRITERS OF SOME OF THE WORLD'S FAVORITE HYMNS

Sarah Fowler Adams, who was born in 1805 and died at the age of forty-three, gave to the world the lovely hymn "Nearer, my God, to Thee." She was a beautiful woman with a vivid imagination and fine powers as a writer. Once in her life she thought of going upon the stage, but she changed her mind and devoted her powers to literature and works of religion. Another fine hymn, "Our Blest Redeemer ere He breathed," was written by Harriet Auber in 1823. It has been translated into every language spoken by Christian peoples.

Two other favorites that have rung throughout the world, "There is a green hill far away" and "Once in royal David's city," are the work of a woman's heart and brain, Mrs. Cecil Frances Alexander. She was born in 1818, and married, when forty-two, the Archbishop of Armagh. She died in 1895. Frances Ridley Havergal, like Bishop Heber and Mrs. Adams, wrote many hymns which will long be sung. The most famous are "Thy life was given for me" and "Take my life and let it be." She had musical talent, and studied for some years in Germany, where she thought of making music, instead of writing, her chief aim in life. She was born at Astley rectory, Worcestershire, in 1836, and died in 1879.

For another of the most famous hymns, "Just as I am, without one plea," we owe thanks to Charlotte Elliott, a member of a clever family, who was born in 1789. As a young woman she gained some fame by writing comic verses, but then came an illness and serious thoughts. Afterward she gave all her talent to writing beautiful verses on religious subjects, and her works did great good.

Horatius Bonar, who was born in Edinburgh in 1808, became a minister when he graduated from the university. He wrote much on religious subjects, but it is by several of his hymns that he is remembered. The better-loved ones are "What a friend we have in Jesus" and "I heard the voice of Jesus say."

THE STORY OF MOODY AND SANKEY AND THEIR FAMOUS HYMN-BOOK

The Moody and Sankey hymns are sung by millions of people all over the world. The book is not made up of hymns by the two revivalists. Sankey wrote the words of a few and composed the music of many, but the bulk of the hymns are by other authors and composers.

Dwight Lyman Moody was born in Massachusetts in 1837, and from early boyhood until the age of seventeen he worked on a farm. Then he became a clerk in a shoe store. While in Chicago he spent much of his life in preaching to young men, and during the Civil War he acted as a missionary in the army.

When he was thirty-six he made the acquaintance of Ira David Sankey, a Pennsylvanian three years younger than himself. Sankey was the son of a banker, and in a better position than Moody had been. He was an earnest Christian worker, who, though he could not preach like Moody, was a good singer and musician. The two men entered together on a mission. They preached all over America and visited England and Australia, and though their methods seemed strange, they made a great impression and did much good by their services.

It was for these services that Sankey got together the famous Moody and Sankey hymn-book. The words of Sankey's own hymns have not the splendor of some others, but they reach the heart. The tunes that he composed, though they are not so beautiful as many of the hymn tunes which Sir Arthur Sullivan wrote, are tunes which anybody with an ear for music can learn and remember.

THE BRAVE BLIND WOMAN WHO WROTE "SAFE IN THE ARMS OF JESUS"

Many of the hymns in "Sankey" bear the name F. J. Crosby. The owner of that name was a brave and cheerful blind woman. Frances Jane Crosby, a very noble woman, lost her sight as a baby and never regained it. She received her education at a school for the blind, and devoted her life to making others good and happy. She wrote over three thousand hymns, of which one, "Safe in the arms of Jesus," is sung everywhere.

There are other American hymn-writers who have written words that have given comfort to many people and which

are sung in churches all over the earth. Two sisters, Alice and Phœbe Cary, wrote religious poems and hymns. Of these the best known is "One sweetly solemn thought," by Phœbe. The sisters were noted for their beautiful lives and for their devotion to each other. They died in the same year, 1871. Of John Greenleaf Whittier we can read on page 4727, for he was a noted literary man. Among his writings was the hymn "Dear Lord and Father of Mankind."

To Phillips Brooks, Protestant Episcopal bishop of Massachusetts, the world owes a favorite Christmas hymn—"O Little Town of Bethlehem." Bishop Brooks was a celebrated preacher and an independent thinker. He died in Boston in 1893. Nor must we forget to mention two hymns which were written by American Presbyterian ministers toward the end of the nineteenth century. The Reverend E. Hopper wrote the beautiful words of "Jesus, Saviour, pilot me." The martial hymn, "Stand up! stand up for Jesus" we owe to the Reverend G. Duffield. The grand words of "It came upon the midnight clear" were written by Edmund Hamilton Sears, of Massachusetts.

Everyone who reads in history the trial of the seven bishops, the brave men who refused to sacrifice their religious beliefs upon the order of a king, will sing with greater pleasure the fine old hymns "Awake, my soul, and with the sun," and "Glory to Thee, my God, this night," when they remember that the writer of them was Bishop William Ken.

Ken had the advantage of studying the works of George Herbert, who wrote some of the finest religious poems in existence. Herbert was born in 1593 and died at the age of forty. As a brother of Lord Herbert he hoped to win court favor. Luckily he did not, but gave himself up to an earnest ministry in the Church and to poetry. It is surprising that more of his hymns do not appear in the hymn-books. He died four years before Bishop Ken was born.

Many famous names appear among the hymns we may call modern. William Cowper, the poet, wrote "God moves in a mysterious way" and "Hark, my soul, it is the Lord." Sir Robert Grant, who was a great scholar, a governor of Bombay, and for years a member of Parliament, wrote "O worship the King."

THE WRITERS OF SOME FAMOUS HYMNS



MARTIN LUTHER

who wrote
"A mighty fortress is our God,"



JOHN MILTON

who wrote, as a boy
"Let us with a gladsome mind."



BISHOP KEN

who wrote "Glory
to Thee, my God, this night."



ISAAC WATTS

wrote 500 hymns, including,
"O God, our help in ages past."



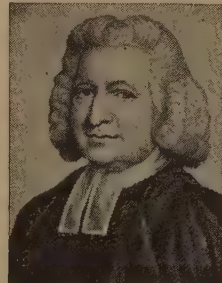
AUGUSTUS M. TOPLADY

who wrote
"Rock of ages, cleft for me."



JOHN WESLEY AND CHARLES WESLEY

the founders of Methodism, who wrote
many thousands of hymns still sung all over the world.



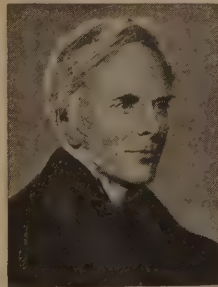
WILLIAM COWPER

who wrote "God
moves in a mysterious way."



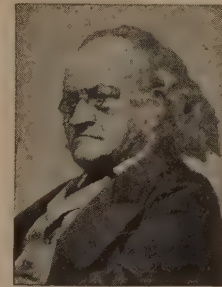
BISHOP HEBER

who wrote "From
Greenland's icy mountains."



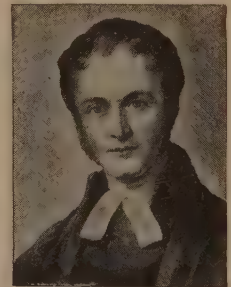
JOHN KEBLE

who wrote "Sun of
my soul, Thou Saviour dear."



SIR JOHN BOWRING

who wrote "In
the Cross of Christ I glory."



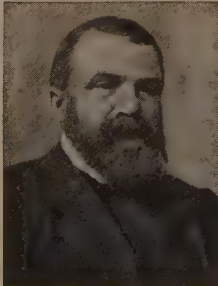
HENRY FRANCIS LYTE

who wrote
"Abide with me."



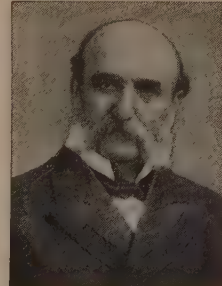
FRANCES HAVERGAL

who wrote
"Take my life and let it be."



D. L. MOODY AND IRA D. SANKEY

the well-known American evangelists, whose col-
lection of hymns is used by religious assemblies everywhere.



BISHOP HOW

who wrote
"Summer suns are glowing."

The photographs of Frances Ridley Havergal and Bishop How are by Elliott & Fry, and that of Ira D. Sankey by Russell.

THE AMBASSADOR WHO WROTE A FAMOUS HYMN AND INVENTED THE FLORIN

Sir John Bowring wrote "In the Cross of Christ I glory." Bowring's life-story would make a good book. He was one of the most wonderful linguists that ever lived. He could speak a hundred languages and read twice as many. He translated into English all the foreign songs and poems he could find. He traveled far and wide. He wanted to change the English money system into a simple one; and the two-shilling piece remains to-day as a reminder of the work that he began. He invented the florin, and it remains one of the most convenient British coins. But when acting as ambassador, Bowring caused a war between China and England over quite a little matter.

The memory of James Drummond Burns, a Free Church minister, lives in the beautiful "Hushed was the evening hymn." He was a Scotsman, born in 1823, and he lived for some years in Madeira and afterward in London. "Blest be the tie that binds" was the work of an English Baptist, the Reverend John Fawcett, a well-known preacher at Wainsgate during the opening years of the nineteenth century. "Rock of Ages" serves to remind us of Augustus Montague Toplady, a clergyman who died more than a century ago; and the beautiful prayer for those in peril on the sea, "Eternal Father, strong to save," makes the name of William Whiting dear to us all.

THE EVENTIDE OF THE ENGLISH CLERGY-MAN WHO WROTE "ABIDE WITH ME"

Very few men receive such affectionate tributes as are paid to Henry Francis Lyte, an English clergyman who has lain in his tomb at Nice since 1847.

Among the hymns that Lyte wrote was "Abide with me." He wrote it on the night that he preached his last sermon, thinking, not of that one night's repose, but of his eternal rest. Now we sing it at the close of evening service in church all over the world. Thousands of people have traveled to Nice as pilgrims to the grave of the man who wrote this hymn.

One of the hymns with a history is that most beautiful one "Lead, kindly Light." It was written by John Henry Newman while he was on the sea. He was a brilliant man in the Church of England, greatly beloved and admired for

his beautiful character and his great gifts. But doubt came upon him, and it was while he doubted that he wrote this hymn. Afterward he left the Protestant Church and became, as a Roman Catholic, Cardinal Newman. At Oxford University, at the same time as Newman, was another gifted scholar and poet, John Keble, the author of "Sun of my soul," a hymn almost as famous as Newman's. Keble College, Oxford, is named after him.

Still another Oxford man to be remembered is Frederick William Faber, who was an enthusiastic follower of Newman. Faber wrote many hymns of which perhaps the best known are "O Paradise, O Paradise" and "There's a wideness in God's mercy."

"ALL HAIL THE POWER OF JESUS' NAME" AND "NOW THE DAY IS OVER"

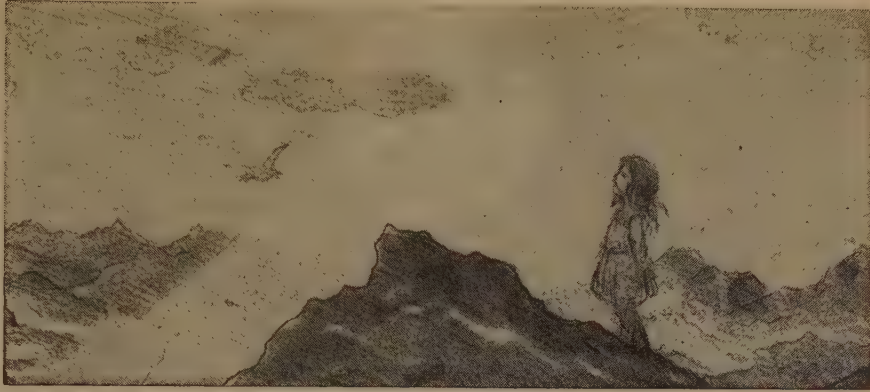
The hymn "All hail the power of Jesus' name" keeps fresh the memory of Edward Perronet, though he has been dead more than a century. He was a friend of the Wesleys and worked with them for a time.

Two very different hymns were written by Sabine Baring-Gould. One is "Onward, Christian soldiers," a battle-hymn with a warlike spirit which many people do not like; the other is "Now the day is over," a peaceful little lullaby hymn which children sing at the end of the day's play. Baring-Gould was a clergyman who wrote many books.

In all the languages of the Christian nations of the world it has been estimated that there are at least four hundred thousand hymns. The greatest number are in German, and the next greatest in English. Wherever missionaries went they took with them their hymns, which they translated into the tongue of the people they instructed. Though the words were in a strange language, the tune was kept. Travelers from North America or the British Isles visiting missions in the South Pacific or in the Far North have been amazed at hearing the dear old familiar airs.

The Sunday-school movement has inspired a great many hymns, as music has been an important part of such weekly gatherings. In North America hymn-books with music and words were printed for Sunday schools before such books were used in the churches proper.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4582.



The sense of wonder stirs in the mind of a child.

THE EMOTIONS OF THE MIND

PEOPLE used to suppose that knowledge made character, and so they thought that teaching everybody to read and write would make everybody wise and good. Now we know that, though learning things is useful, and though we cannot do without knowledge, knowledge in itself does not make us wise and good. Knowledge and the intellect do not decide our deeds one way or the other; they are simply power, and power, like dynamite, may cause an explosion and bury a hundred men, or it may blast the rock which buries them and so set them free.

The boy who learns to write may turn his knowledge to good account by writing something that will make men better for all time, or he may turn his knowledge to account by writing poisonous lies.

There is another part of the mind more important than the intellect; more important just because it, more than the intellect, decides our deeds; and this is the part of the mind which feels and wills. The proper name for these feelings is *emotions*, and it is emotions that decide our deeds in a large measure. That is why they are really the most important part of the human mind. Everyone will agree

CONTINUED FROM 4183



that the really important thing is deeds; it is deeds that make the man, the nation and history.

When we come to consider our emotions we find that they must be studied along with what are commonly called instincts. For instance, everyone knows that there is such a thing as the instinct of flight, and we know quite well that flight has something to do with being afraid.

The emotion of fear is one of the great emotions that decide the deeds of men and women and children in all places and ages. We may fear for ourselves or for others; we may fear something in this world or something in the next. But in any case this is one of the great emotions that make history. Fear acts especially by preventing actions; it is the great controlling emotion that keeps people from doing things, and it has always been used by masters and governors of all kinds as an instrument to prevent people from doing what they did not want them to do.

Another important emotion is disgust, which is not the same as fear; and that goes with the instinct which may be called the instinct of repulsion, which makes us shrink from slimy or creepy things.

Vastly more important is the instinct of curiosity, which goes with the emotion of wonder. Curiosity has become very marked among the higher animals. The emotion of wonder is very powerful in human life, but it is not really very common in grown-up people in any strong form. Almost all children have it, and perhaps it often leads them into mischief, gets them into accidents, and so on; but boys and girls would learn very little without it.

Among grown-up people the feeling of wonder often dies, and they take all usual things for granted. Yet the instinct of curiosity and the emotion of wonder are immensely important, because in every age they persist in a few people, even when those people grow up. In them it is the main source of their intellectual effort; it is one of the principal roots of science and religion, driving men to discovery and invention and to theories of the world and of mankind. We are on the way toward having a really great man when a strong emotion of wonder and the instinct of curiosity are combined with a fine intellect which these things can use as their instrument.

THE INSTINCT THAT INSURES THE FUTURE OF THE RACE

Very important also is the fighting instinct, and the emotion of anger which goes with it. This is not nearly so common as the emotion of fear, which in some form or other is possessed by everybody—even by those who think they do not know what fear is.

In the lower animals we generally find that this instinct occurs among females only when they have their young to protect; but at such times they are extremely powerful, as men have known for many ages. Anyone can see the importance of this, for it means the protection of the young and the future of the race; and that is why we find the character of the creature showing a new aspect when she becomes a mother. She is then capable of such tremendous anger that her young are protected from their enemies. We think of the tiger as a courageous and terrible animal, but we are told that in India even the tiger rarely dares to attack a young elephant protected by its mother, though perhaps he would not hesitate to attack the mother herself at any other time.

When we are under the influence of the

fighting instinct and the feeling of anger we sometimes show clear signs of our relation to the lower animals. We are likely to raise the upper lip and sneer and snarl. What this really means, if we knew it, is baring the teeth to prepare for biting. As we grow older these feelings do not disappear in us, but they take a different form, which is not only different but higher. It is one of the great marks of mankind that our instincts may take higher forms as we grow up. In well-developed men anger and the fighting instinct give place to courage, energy and persistence. If difficulties are in the way, they only arouse our resolve to overcome them. So that this instinct may have low forms and high forms.

THE NOBLEST AND HIGHEST OF ALL THE HUMAN INSTINCTS

Next we come to the most important of all our instincts, without which no human being could survive its birth for more than a few hours. This is the instinct of fathers and mothers, found much more strongly in mothers, though many fathers have it too. We may call it the mother instinct, though the more correct name for it is the *parental instinct*. So far as we know the world within us and the universe without us, this feeling is the noblest and highest of all instincts, so that we call God Father, and say that God is Love.

This instinct is more important for mankind than it is for any animals, for human babies are born more helpless and need love and care much longer than the offspring of any other living creature. It is not found among the lowest animals, but is found in increasing strength among the higher kinds. So far as we can judge it began in the history of the world with fishes. Some fishes watch over their eggs and drive away enemies which might destroy them. From this stage upward the protection of the young comes more and more to depend on the parents' feelings and behavior, and the young need parental tenderness for a longer and longer period.

THE UNSELFISH LOVE OF A MOTHER FOR HER CHILD

At last we reach the highest stage, where comparatively few young beings are born, but they are so well taken care of that most of them grow up. In such cases, says one authority, "the protection and cherishing of the young is the con-

stant and all-absorbing occupation of the mother, to which she devotes all her energies, and in the course of which she will at any time undergo privation, pain and death. The instinct becomes more powerful than any other, and can override any other, even fear itself; for it works directly in the service of the race, while the other instincts work primarily in the service of the individual life, for which Nature cares little."

No one can question for a moment that this instinct goes with the emotion of love or tenderness. We can see it in cats, and it may often be noticed among birds. During sixteen hours of a summer day a pair of tits carried without interruption two thousand separate morsels of food to their young ones. Only a powerful feeling could enable them to continue such a work.

THE FEELING THAT PROMPTS THE BEST THINGS IN HUMAN NATURE

The feeling of parents for their young is far stronger than the feeling of children for their parents—a proof of the fact that this feeling is not gratitude or expectation of advantage, but genuinely unselfish. From this instinct, and the love which goes with it, spring good things in human nature—generosity, gratitude, pity, unselfishness, true love of our neighbors. When we seem to do good deeds for any other reason than because this feeling is behind us, our deeds are not really good, but are done for the sake of some reward or to avoid some punishment. The great fighting instinct, together with its emotion of anger, is specially aroused whenever the working of some other great instinct is interfered with. We saw how even gentle female nature may become fierce and terrible when the parental instinct joins with the fighting instinct.

When we find a man indignant at some injustice or cruelty—at slavery or cruelty to children—it is tenderness for the helpless, coupled with anger and the strong fighting instinct, that really makes this splendid indignation.

THE DIFFERENCE BETWEEN ONE KIND OF COMPANY AND ANOTHER

There are some other instincts of less importance; but it will be enough for us to have learned once and for all how important the instincts are, to learn that with each of the great instincts there goes a corresponding emotion, and, above all, to learn that these instincts and feelings have a great deal to do with conduct.

Three words describe other facts of our minds which also explain a great many of the things we do. They are *sympathy*, *suggestion* and *imitation*. Let us look at them for a minute or two.

Sympathy really means "feeling with," and it is a fact that the signs of other people's feelings do incline us to feel the same way. A baby smiles when it sees a smiling face; a baby or small child is very likely to cry when it hears other children crying. A merry face makes us feel brighter; we are terrified when we hear other people scream with terror. Nothing makes us angry more readily than other people's anger. Everyone knows what a difference it makes to be in one kind of company rather than another.

Suggestion is an extraordinary power we have over each other, whereby we can often persuade each other to do all sorts of things without any real reason. It would be easy to write a book about suggestion, and, indeed, many books have been written on the kind of suggestion that occurs when people have been *hypnotized*.

THE MISTAKEN IDEA OF THE POWER OF HYPNOTISM

Most people have heard of hypnotism. Only a few have any idea whether all that is said of it is rubbish, or whether there is any truth in the stories that have been told of what those who profess to be able to hypnotize others can do with their subjects or patients.

The exaggerations about hypnotism have found their way into fiction. Some people really believe that a hypnotist, having exerted his influence on a patient, can make that patient do what he wills and believe what he likes, even to the extent of carrying out the wildest commands suggested when in the hypnotic state. Most of that is not true; but some part of it is true for certain people, such people usually being those who are not in a quite sound state of mind. By that we do not mean that they are not sane, but that they are not quite well balanced.

The so-called hypnotism of these people is akin to impressing on their minds a suggestion of what is happening or is going to happen to them, and impressing it so strongly that they believe it firmly. One of the simplest examples would be that of a person who was sleeping badly, and having gone to a doctor for a remedy,

should be given a dose of medicine to take, with the words: "Now take this just before you go to bed, and you will sleep all right." The dose might contain nothing that would make the patient sleep; but if the patient so thoroughly believed that it did, he probably would sleep after taking it. That would be because the suggestion had sunk into his mind.

WHAT A FRENCH DOCTOR DID WITH HIS LITTLE SPINNING MIRROR

All hypnotism is a form of suggestion. But several of the honest scientific practitioners of suggestion, such as Dr. Charcot, of the Salpêtrière in Paris, adopted additional devices for making the mind of the patient more open to suggestion. Thus Dr. Charcot used to have a little spinning mirror reflecting a beam of light on which his patients were told to fix their eyes. The beam of bright light, perhaps by its effect on straining the muscles of the eye and its blood-vessels, caused the patients to sink into a sleepy state. That was what we might call a bodily effect. The mental effect which accompanied it was that their minds became emptied of other thoughts—became a blank, as we wrongly say—and were therefore more likely to be impressed by commands issued by the doctor.

But two things are to be noted about Dr. Charcot and his methods of hypnotism. The first was that he believed that by this hypnotic treatment he could *cure* ills both of the body and the mind, and that the effect of putting a patient into the hypnotic state of sleepiness was itself curative. The second thing was that his patients and his "cures" did not tend to grow more numerous.

HOW SUGGESTION CAN AFFECT THE MIND OF A MAN

Dr. Charcot's views and methods were then first criticized and afterward superseded by the Nancy School of hypnotism, of which we may say that Dr. Coué is a descendant. These said that Charcot's hypnotism was not curative, that it did not make the patient different or cure him, and that everything the patients did after Charcot had hypnotized them was due merely to the effect of "suggestion" on their minds. Finally the Nancy School triumphed, and it became more and more recognized that the only use of hypnotism was to make people more ready to accept and follow suggestions

made to them, and that all the effects of hypnotism could be obtained if suggestions were made to them powerfully enough and often enough by doctors in whom the patients believed. Suggestion as a means of helping the patient took the place of hypnotism, and it became admitted that the whole business was simply one of an effect on the *mind*.

That is not the end of the matter, so far as the best medical men to-day see it. The World War opened their eyes a great deal, both as to the uses of suggestion, or hypnotism, in shell-shock cases, and as to the limits of what could, and can, be done with it. Suggestion is still used, and may be properly used to have an effect, sometimes a good effect, on a man's mind; but its effects are often temporary. It might perhaps be compared to the use of a drug. A drug will stop toothache or headache, and many other ills for a time; but if the cause of the toothache is a decayed tooth, or if the headache is due to some deep-seated ill in the body, the aches will return.

THE FAILURE OF SUGGESTION TO HEAL THE MIND DISEASED

In the same way it is found that suggestion or hypnotism alone will fail to cure a mental ill, a nervous breakdown, a temporary paralysis, unless the cause is removed. The best that these remedies can do is to *expose the cause*. The cause, the ill, must itself be remedied. It may turn out to be, and often is, not a disorder in the body but a disorder in the mind.

So we may finally say that hypnotism has had its day and is passing away. Its place is being taken more and more by the modern methods of analyzing the patient's mind without recourse to the old expedients. But these modern methods of analysis, though they have been very useful, are in their turn being found to be of small avail in removing the cause of trouble. There is yet no universal medicine for the mind diseased.

Imitation is also a great fact of our minds, living, as we do, in each other's company, for it explains many of the facts and the doings of men. We see it at all ages, and especially in the earlier ages of life, and it is one of those things to be remembered by people who suppose that man never does anything without a well-thought-out reason for it.

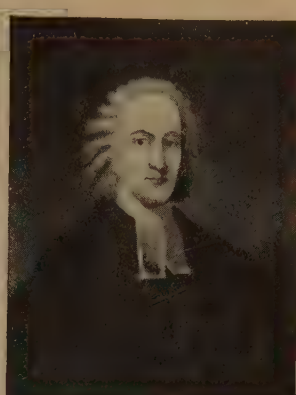
THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 4553.



Cotton Mather.



Governor John Winthrop.



Jonathan Edwards.

AMERICAN LITERATURE IN COLONIAL TIMES

WHEN we begin to study the literature of the United States we find no primitive literature. Europe had grown up before this nation was founded, and the men who founded it thought and wrote as men of the seventeenth century. The bards and troubadours were gone, and the early leaders had no minstrels in their following to sing their deeds in hall to the music of the harp, or hand down the story of their heroic adventures by word of mouth. This does not say, however, that American literature has no inheritance from the past, for the early settlers brought with them to their new home the great heritage of English literature as well as the English tongue.

Naturally, then, the early American literature is as English in its character as anything that was written in the seventeenth century. It was not until the coming of a generation whose fathers were born on American soil that we begin to see the growth of anything like independent thought showing itself in writing, and for a long time, almost two centuries, American writers consciously formed themselves on the model of the men who were writing in England.

The first books written in America were "A True Relation of Such Occur-



rences and Accidents of Note as Hath Happened in Virginia," published in

London, in 1608, and "A Map of the Bay and the Rivers with an Annexed Relation of the Countries and Nations

Which Inhabit Them." Neither of them was intended as a book. They were reports for the Virginia Company, written in the first years of the Virginia colony by Captain John Smith, but he contrived to put into them so much vigor of expression and beauty of language that in places they come very near to being what we call literature. As time went on, attempts were made in Virginia to write poetry, which was of little interest. Books of travel and history give us a better idea of life in the colony, and the Burwell Papers a history of Bacon's Rebellion, The History of the Present State of Virginia, written by Robert Beverley in 1705, and Colonel William Byrd's History of the Dividing Line between Virginia and North Carolina make good reading and are of much interest to students of history.

The early New England settlers also began at once to write accounts of the new conditions under which they had to live. Governor William Bradford of Plymouth wrote The History of Plymouth Plantation, down to the year

1646, and Governor John Winthrop of Massachusetts Bay wrote *The History of New England*, which is really an account of his own governorship. From these and other histories Hawthorne later drew his tales of Puritan life. The writings of the governors are interesting, but we can scarcely give the name of literature to either of the books or to others that came after them. The most interesting is Nathaniel Ward's *Simple Cobbler of Agawam*, a satire.

There was no such poetry produced in New England in the seventeenth century as poets and dramatists were then writing in Old England. Life in New England

and everything that would make life gay. Nor can we well understand the hardships endured and the hard work done by everyone—men and women, boys and girls alike.

SOME OF THE GREAT NEW ENGLAND PREACHERS

Life was so hard that it would have been a wonder if anything like real literature had been written. Indeed, almost the only men who had leisure to write in the early days were the ministers of the churches, whose duty it was to occupy both time and imagination in composing learned sermons, each one of which consumed two or three hours in the preaching.



This picture gives an idea of the way Leyden Street, in Plymouth, looked in 1621, with Governor Bradford's house at the foot of the hill. Other houses stood across the road from his, and the fort and burial place were at the top of the hill.

From a painting copyrighted by A. S. Burbank.

was too stern and grim, and even if Milton himself had joined one of the bands of Puritan settlers, he might have been so overwhelmed by the terrors which surrounded them that his imagination would have refused to do his bidding and call up pictures for his pen to write. It is hard for us now to imagine the dense forests along the Atlantic coast into which the colonists slashed their way, and which they believed were the haunts of evil spirits. It is almost as hard to make real to ourselves the ever present fear of the bands of Indians that lurked in the pathless woods, or to keep in mind the scarcity of books and pictures and music

It was an age of long sermons and great preachers. Sunday was strictly and sternly kept, and everyone, down to the smallest children, had to go to church. The sermons were well remembered, too. They were discussed during the week by the fireside, in the fields and at the blacksmith's shop and even in the tavern, and took the place of books when the general run of people had none except their Bibles.

It is not strange, then, that for anything approaching literature in the first century and a half of New England life we must fall back on sermons by preachers such as Roger Williams, Richard Mather and his son Increase, Thomas Hooker

and Thomas Shepard, men of learning, who spent their lives in preaching and writing. Cotton Mather, the son of Increase, is famous for an ecclesiastical history of New England known as *Magnalia Christi Americana*, and Michael Wigglesworth is noted for a poem called *The Day of Doom*, which is really a sermon in verse. It pictures the sinner in torment in the hereafter.

JONATHAN EDWARDS, ONE OF THE MOST ORIGINAL AMERICAN THINKERS

All these preachers were great men of their time, but greatest among them all was Jonathan Edwards, who belongs to the eighteenth century. He was born in 1703 at East Windsor, in Connecticut, where his father was pastor, and was not only the son but the grandson of ministers. When he was thirteen he entered Yale. He graduated at the age of seventeen, then studied for the ministry, and after some time was made assistant to his maternal grandfather at the church in Northampton, Massachusetts.

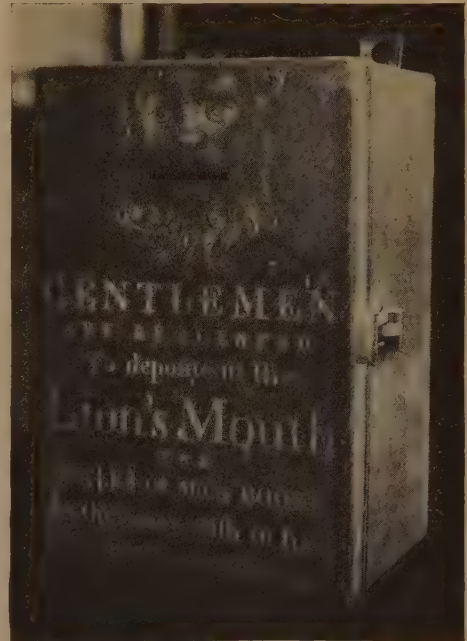
After his grandfather's death he was placed in full charge of the church, which he had already made famous throughout New England by his preaching. His sermons were the cause of a religious revival known as the "Great Awakening." Very terrible some of these sermons were, especially one which is called "Sinners in the Hands of an Angry God," but they had a great effect on the minds of people at that time when people were taught more about the judgment of God than of God's love.

Edwards lived at Northampton from 1727 until 1750. Then his congregation quarreled with him, partly because he objected to the young people's reading and talking about worldly books, such as the new novels which had begun to come out from England. He was compelled to leave the church where he had taught so long and to seek a new home at Stockbridge, in Connecticut, where he taught the Indians and a handful of white people. But while there he had leisure to write *The Freedom of the Will*, which is the greatest of his books. This brought him renewed fame, and about the end of 1757 he was chosen president of the new college at Princeton, where he died in the beginning of 1758, almost before he had taken up his new duties.

Jonathan Edwards is still spoken of as the most original of American thinkers,

and his books have had a profound influence on students of theology and metaphysics. They are, in the first place, books of philosophy, but they are so well written that they may be classed as literature. If we were to read his sermons alone, we would probably think he was a hard, stern man, but the real Jonathan Edwards was the man who said:

So that, when we are delighted with flowers, meadows and gentle breezes of wind, we may believe that we see only the emanations of the sweet benevolence of Jesus Christ. . . . When we behold the light and brightness of



Courtesy The Library Company of Philadelphia.

This interesting old box in Philadelphia reminds us of the days when Franklin helped to found the Library Company and when books had to be brought from abroad.

the sun, the golden edges of an evening cloud, or the beauteous bow, we behold the adumbrations of his glory and goodness; and in the blue sky of his mildness and gentleness.

The man who wrote that was a poet at heart.

BENJAMIN FRANKLIN AND POOR RICHARD'S ALMANAC

Benjamin Franklin, to whom we come next, was greater as statesman, diplomat and scientist than as writer. More than anyone of his day, he may be compared to some of the many-sided men of the Renaissance, and he probably exerted as much influence on his own times and the times that came after as any other man

who lived in his generation. It is as a writer, however, that we must think of him here; and to understand him as a writer we must go back a little way and glance at the time that came immediately before him.

Toward the close of the seventeenth century more books had begun to come into the colonies. The works of Pope, Addison, Swift, Locke and others were brought over by men who had been educated in England, or were imported by merchants and sold. Young men even began to write in imitation of Addison and Pope. Franklin's own grandfather, Peter Folger, was something of a poet, and when Franklin himself was a boy his father was able to point out mistakes that he made in composition.

Benjamin Franklin lived so long in Philadelphia that we associate him with that city, but he was born in Boston in the year 1706. You see, he was three years younger than Jonathan Edwards. He went to school for only two years, and when

he was ten years old his father, a tallow-chandler, took him into his own shop. The boy did not like candle-making, however, and when he was twelve he was apprenticed to his brother James, who had set up a printing-press and had begun to publish a journal.

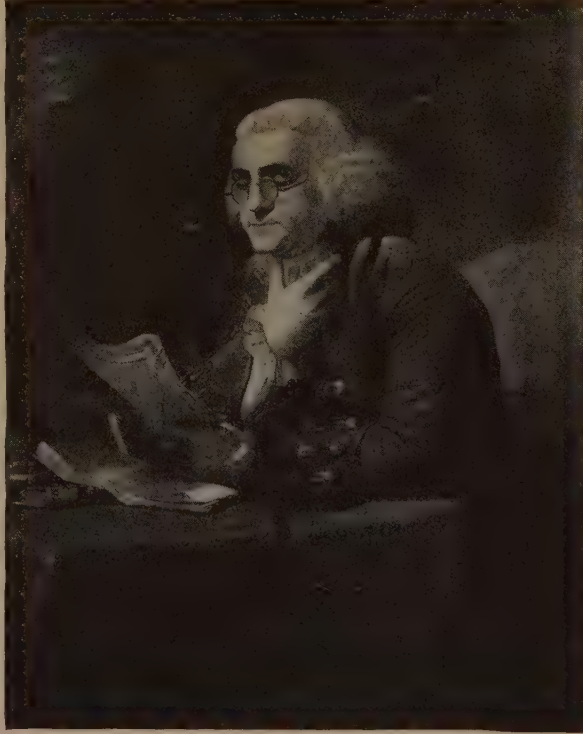
James Franklin had been for some time in London, where he bought his press, and had brought back with him a small library of well selected books, all of which were devoured by Benjamin, who had already read everything he could get. The print-

ing-house, with its bookish atmosphere and the constant talk and criticism that went on among his brother's friends, was an excellent school for his eager mind. He soon began to write, with Addison for his model and his father at times for critic; and by the time he was sixteen he felt sufficient confidence in himself to slip an anonymous essay under the door of the printing office. It was accepted and printed, and Benjamin Franklin was soon a regular contributor to the paper.

In 1723, however, the two brothers seem to have quarreled. Benjamin quietly left home, made his way to Philadelphia and there went to work as a printer. He identified himself with the city, and for the next twenty-five years he engaged in printing, wrote essays and found time for philanthropy, inventions and science.

At this time almanacs were much in demand, especially in the country, where an almanac was often one of the very few books to be found in a household. In 1733 Franklin,

under the name of Richard Saunders, began to publish one of these useful books. The calendar was interspersed with witty sayings, proverbs, verses, anecdotes and short stories, each with its moral. The work became so popular that as many as ten thousand copies were sold in one year, and the proverbs, with their short, pithy sentences, became household words. By such sayings as "Remember what Poor Richard says, Many a Little makes a Mickle," and further "Beware of little expenses, a



From a painting in Independence Hall, Philadelphia. The original of this portrait of Benjamin Franklin, known as the Martin portrait or, sometimes, the "thumb portrait," was painted in England in 1765, in his sixtieth year.

Small Leak will sink a great ship," and hundreds of others like them, he taught thrift and practical common sense for a quarter of a century. Then he gathered the best of them into a preface for the last year, and this discourse, as he called it, has been reprinted hundreds of times in both English and French.

Franklin as a writer is best known through Poor Richard's Almanac and his

which was well known to school children a generation ago.

He founded in Philadelphia a club called the Junto, for literary and scientific research. The members gathered their books together in the house of Robert Grace in Pewter Platter Alley, now known as Church Street. From this beginning at Franklin's suggestion was established the first circulating li-



© Franklin Printing Company, founded in 1728 by Benjamin Franklin.

This picture, from a water-color by Edward Penfield, shows young Franklin hauling paper to his own shop, which was in Philadelphia. In 1730 he married his wife Deborah, who is seen here standing in the doorway. Among the many interests of his life books always had a most prominent place.

Photos on this page and on pages 4448 and 4450 by Philip B. Wallace.

autobiography, which is one of the best that has ever been written. But he also wrote a large number of essays full of racy, homely humor that was not English but American, and he has been called the first characteristically American writer. His essays belong chiefly to political literature, which was brought to a high state of excellence toward the close of the colonial period, and besides these he wrote some dainty trifles like The Ephemera,

brary with a continuous existence in America.

From time to time the library shifted its quarters, and during the occupation of Philadelphia by the British in 1773 Carpenter Hall, its site at the time, was used as a hospital for the British forces. The Library, however, was not harmed in any way, and after the war a new building was erected and occupied until 1880, when the site of the present Library was en-

tered upon. When in Philadelphia we can see the first invoice of the library.

Franklin's high esteem for books and printing is plainly reflected in the epigraph he wrote for himself:

The body of B. Franklin, Printer, (like the cover of an old book, its contents torn out and stript of its lettering and gilding) lies here food for worms, but the work shall not be lost, for it will (as he believed) appear once more in a new and more elegant edition, revised and corrected by the author.

THE POLITICAL WRITERS OF THE REVOLUTION

Toward the period of the Revolution the whole tone of literature in the colonies



Courtesy The Historical Society of Pennsylvania. This is Franklin's music stand, which in reality is a combination rack and music box.

changed. People turned from the discussion of sermons to the discussion of politics, and indeed the sermons of the time helped them on in this. From imitating Addison and Pope they turned to the writing of satires and political pamphlets. It is not easy for us now, perhaps, to realize the stormy days through which the country passed in the years immediately before and after the Revolution, and it is only by reading some of the innumerable pamphlets that were published at the time that we can get some idea of the excitement and see the growth of revolutionary feeling.

James Otis and John and Samuel Adams, of Boston, Francis Hopkinson and John Dickinson, of Philadelphia, Philip

Freneau and Alexander Hamilton are the most famous of these writers. From the point of view of literature the most interesting is John Dickinson, who wrote Letters from a Farmer in Philadelphia and also the greater part of the Declaration of Rights and the Petition to the King.

The man, however, who had most influence in stirring up the people was Thomas Paine, a fiery little Englishman who had come to the country in 1774. He wrote Common Sense and The Crisis, a series of sixteen pamphlets the first of which began with the famous words: "These are the times that try men's souls. The summer soldier and the winter patriot will, in this crisis, shrink from the service of his country; but he that stands it now, deserves the love and thanks of man and woman."

THE FEDERALIST AND ITS THREE AUTHORS

It was not a time when men could sit down quietly to think and write for the sake of creating something of beauty, so we look vainly for great literature either in this period or in the years that succeeded the Revolution, when the country was in a state of chaos.

The only thing of real note with which we can end the eighteenth century is a collection of papers or essays which were written after the Constitution was signed. There was some doubt whether New York would ratify the Constitution, and Alexander Hamilton suggested to James Madison and John Jay that between them they write a series of essays to explain it, so that people could understand it. Eighty-five of the essays were written, and of these Hamilton wrote at least fifty-one and probably several more. The whole collection became known as the Federalist, and is famous as the first explanation of the Constitution and its meaning. It is still read, and when the Union of South Africa was being formed no book was more frequently quoted.

A little poetry was written, but it is not read now. Francis Hopkinson wrote the Battle of the Kegs, and Philip Freneau's Indian Burying Ground is remembered. Thomas Godfrey wrote the first play in verse, called The Prince of Parthia. Joel Barlow's Vision of Columbus is amusing, though the author did not intend it to be so. A negro girl, Phyllis Wheatley, wrote verses which were much admired.

THE NEXT STORY OF LITERATURE IS ON PAGE 4625.



A troop of Boy Scouts on a hike to the camping grounds.

THE BOY SCOUTS OF AMERICA

A BOY SCOUT! He hikes through the woods and he camps in the open. He can kindle a fire on the wettest day; and like an old pioneer, he reads the signs of the trail. He can tie a knot that will hold; he can swim a river and pitch a tent; he can mend a tear in his uniform, or cook his own dinner. He knows which fruits and seeds are poisonous; he can sight nut-bearing trees from afar. He can reef a sail or pull an oar. He knows the stars by name and can find his way by their guidance. The birds and animals and fish are his friends.

A Scout never flinches in time of danger. He knows what to do in case of fire, panic or accident. He trains his body, and in all emergencies he sets an example of courage, coolness and resourcefulness. He is especially thoughtful for the helpless and weak. Most of his character is exactly suited to the boy's love of adventure and heroism. It gives his energy and initiative the right outlet. A Scout makes himself known to a brother Scout by a sign that only Scouts may give. He has brothers in every city in the land and in every country in the world. Wherever he goes his brother Scouts give him a friendly welcome.

A Scout knows his city as well as he knows the forest trails. He can guide



a stranger through the streets; and he knows where fire alarms and police stations are located, and where the nearest doctor lives. He is familiar with the names of the city officials and their duties.

He is proud of his city and glad to serve it whenever he can.

Almost everybody knows the Scouts. The Boy Scouts of America was incorporated in 1910. The Scouting idea came into being in 1908. Previous to that there had been movements for making boys strong physically and mentally, and encouraging them to live out of doors. Dan Beard, struck by the fact that city boys did not even know how to spin a top properly or play marbles skillfully, founded a society called "Sons of Daniel Boone," to encourage boys to live out of doors, and by teaching them handicraft of all sorts, make their clumsy fingers "do things." Mr. Ernest Thompson Seton, the writer, was working along the same lines with his Woodcraft Societies, in which he emphasized Indian lore.

Finally, in 1908, Lieutenant-General Sir Robert S. S. Baden-Powell of the British army combined their ideas, added more of his own, and material from other sources, and called his idea "Scouting." He had been deeply worried, while he served in South

Africa during the war, at the thin, flat-chested type of young men in the army and their inability to take care of themselves. Some of them actually expected to find electric lights in the desert and to be tucked into bed at night. What the world needed, he felt, was a programme to train boys—to make them strong and hardy, independent, manly and resourceful, and clean and sound in heart. So he designed the Boy Scout programme to give them this training and wrote Scouting for Boys.

THE BEGINNING OF THE MOVEMENT KNOWN AS THE BOY SCOUTS

The movement was brought to America through the "good turn" of one unknown English Scout. An American traveler was hunting in bewilderment for an address on a foggy English street when a boy saluted and asked if he might help him. "Yes," said the American, "you can tell me where to find this address." "I'll take you there," replied the boy. When the American tried to tip him at the end of the journey, the boy refused the coin. "I am a Boy Scout, Sir, and Boy Scouts do not take tips."

The traveler was interested and asked what Boy Scouts were. "I'll take you to Headquarters," said the Scout, and when the American returned from his appointment, the boy was still waiting. The outcome of this Scout's "good turn" was that the American returned to his home with a trunk full of pamphlets on Scouting. He distributed them among men interested in boys, who decided that the movement must be promoted in this country, and the Boy Scouts of America was incorporated on February 8, 1910. Every year Boy Scouts throughout America observe their birthday anniversary with special ceremonies and recommit themselves to the principles of Scouting.

THE BIGGEST BOYS' CLUB IN THE WORLD AND THE BEST

From this beginning has grown the biggest boys' club in the world. Scouting is organized in over 50 countries. There are more than 700,000 members of the Boy Scouts of America in the United States alone. It is estimated that over 2,000,000 boys have passed through the movement here. Think what that means! The time spent by Scouts in camp in one summer amounts to about 4,000 years; the miles over which they travel to get there and return amount

to 400 times around the world; the distance they hike while in camp it would take 290 years to cover at the rate of 4 miles an hour; they swim a space equal to 200 times across the Atlantic Ocean.

In the summer of 1924 a Boy Scout Jamboree was held in Copenhagen, Denmark, in which 6,000 boys, representing 32 different nations, took part. The American troop won the World Scout Championship. Contests included camping, hiking, swimming, canoeing, life-saving, and various forms of Scout craft.

A boy may join the Boy Scouts of America when he is twelve years old. The lowest rank is that of Tenderfoot. After that come Second Class and First Class. There are strict tests for each rank which the Scout must pass before he can receive his badge. When he is a First Class Scout the entire merit-badge field is open to him. Whether a boy wants a hobby or needs to learn a trade, he will find help through Scouting. The merit-badge subjects number 71, including such different things as plumbing, carpentry, life-saving, aviation, music, angling and personal health. A boy masters his chosen subject, passes the tests and receives the merit badge. When he has earned five badges he becomes a Star Scout. Ten qualify him for Life rank. When he has earned twenty-one merit badges, which include first aid, life-saving, personal health, public health, cooking, camping, civics, bird study, pathfinding, pioneering and athletics or physical development, he becomes the proud owner of an Eagle badge, and has reached the highest rank in Scouting.

LEARNING HOW BY DOING REAL THINGS

A boy finds the Scout method, "learning by doing," real fun, and he is learning to do worth-while things at the same time. For instance, it is fun to build a bonfire in a back yard, but it is much more fun to build it out in the open and cook one's dinner on a stick, and the Scout learns how to take care of himself in the woods at the same time. He learns how to build camp-shelters out of branches, make bridges, signal to other Scouts and follow a track, in the same way—by doing these things.

Scouts do many other worth-while things too. Boy Scout Firemen are official aides to fire departments in many cities and country districts. Their busi-

MAKING AND BREAKING CAMP



The 300,000 and more members of the Boy Scouts of America try each year to have a few weeks of life outdoors, where they learn many practical things—such as first aid and life-saving, cooking, swimming, gain a knowledge of animals, trees, flowers and the stars, and acquire the spirit of self-reliance. Here we see the Scouts ready to make camp, and doing quick work on their tents.



In this picture the Scouts are striking their tent after a camp at their summer farm. Scouting teaches boys the value of team-work, and does not permit of shirking. Each Scout must pass certain tests in practical knowledge and be ready at all times to do his part in the application of it. The boys in camp are taught to guard their health, and the Scout camp is marked by careful scouting arrangements.

ness is to "stop the fire before it happens"; in their khaki uniforms they make inspections to see that hallways are kept clear of rubbish, fire-escapes free from obstacles, and that no materials are left lying around. In fighting forest fires Boy Scouts are a big help to rangers and the state departments of forestry. One hundred boys received medals from the State Department in Pennsylvania in one year. Sixteen California Scouts left one Saturday afternoon and fought a raging forest fire until Sunday. The fire had been burning two weeks and fifty men had been unable to stop it. The Scouts put out the flames in two days and two nights because they were *prepared*.

Boy Scout Policemen are just as useful. At parades, county fairs, or any gathering of people, they park automobiles, direct the crowds and keep them in line, and even manage the traffic. In the great city of New York, with its millions of people hurrying across the streets every minute and thousands of cars darting up and down the thoroughfares, Boy Scouts were allowed to act as traffic policemen as a feature of Columbus Day. The Police Department had confidence in them because the boys had Scout training.

A BOY SCOUT MAY SAVE A LIFE

Every boy wants to be a hero. That is one reason why some eight thousand Boy Scouts win merit badges in first aid each year. First-aid training makes the boy useful in an emergency. In a desperate moment of crisis when parents and friends in a panic stood helpless and watched a baby bleeding to death from a severed artery, a sixteen-year-old Eagle Scout calmly put into practice his first-aid training; and by pressing back the openings of the wound, held them in place with a silver knife, and performed expertly with soft old linen the required bandaging.

Another Scout was able to save the life of his friend by his knowledge of first aid. The boy in his play had crashed into a glass door and had broken his arm and severed a small artery in his wrist on the jagged glass. With blood streaming, and half faint from pain and loss of blood, he was in a serious condition when the Scout reached him and checked the hemorrhage with a tourniquet. You may learn some of the methods of giving First Aid on pages 4266, 4732 and 5000.

THE SCOUT OATH AND LAW AND THE AIM OF THE ORGANIZATION

The aim of the Boy Scouts of America is to train boys for citizenship. Every boy wants to grow into the kind of man of whom his country can be proud. Every boy hopes to be a leader. Scout training will help him. The big men of our country have been scouts—not in name, but in character and principle, and their training was like the training the Boy Scout gets to-day. Washington, Franklin, Lincoln and Roosevelt are types of men that Boy Scouts want to be.

A large factor in the training of the Scout is the Scout Oath and Law. Before he becomes a Scout a boy must promise:

On my honor I will do my best: (1) To do my duty to God and my country and to obey the Scout Law; (2) to help other people at all times; (3) to keep myself physically strong, mentally awake and morally straight.

This is the Scout Law:

1. *A Scout is trustworthy.* A Scout's honor is to be trusted. If he were to violate his honor by telling a lie, or by cheating, or by not doing exactly a given task, when trusted on his honor, he may be directed to hand over his Scout badge.

2. *A Scout is loyal.* He is loyal to all to whom loyalty is due: his Scout leader, his home, and parents and country.

3. *A Scout is helpful.* He must be prepared at any time to save life, help injured persons, and share the home duties. He must do at least one good turn to somebody every day.

4. *A Scout is friendly.* He is a friend to all and a brother to every other Scout.

5. *A Scout is courteous.* He is polite to all, especially to women and children, old people and the weak and helpless. He must not take pay for being helpful or courteous.

6. *A Scout is kind.* He is a friend to animals. He will not kill or hurt any living creature needlessly, but will strive to save and protect all harmless life.

7. *A Scout is obedient.* He obeys his parents, Scoutmaster, patrol leader, and all other duly constituted authorities.

8. *A Scout is cheerful.* He smiles whenever he can. His obedience to orders is prompt and cheery. He never shirks or grumbles at hardships.

9. *A Scout is thrifty.* He does not wantonly destroy property. He works

MEALS ON THE ROAD AND IN CAMP



These Scouts are enjoying their luncheon after a morning's hike. Eggs fried on a hot stone are delicious. The Boy Scout is an outdoor chef and waits for no cooks. He can kindle his fire himself, and if the matches are wet, he knows how to get a blaze without them.



This picture shows a kitchen squad at a Scout camp and rally. Each First Class Scout is able to prepare a meal in a manner that is often of great assistance to mother. There is one troop that can break ground at a new camping-place and have tents up and fire built and everything in order, and can produce a pan of smoking popovers within twenty-eight minutes of the arrival of the troop on the camping-ground.

faithfully, wastes nothing, and makes the best use of his opportunities. He saves his money so that he may pay his own way, be generous to those in need, and helpful to worthy objects. He may work for pay, but must not receive tips for courtesies or good turns.

10. *A Scout is brave.* He has the courage to face danger in spite of fear and to stand up for the right against the coaxings of friends or the jeers or threats of enemies, and defeat does not down him.

not be a very big thing—helping an old woman to cross the street, removing a banana skin from the pavement so that people may not fall, or giving water to a thirsty horse. Yet, it is a big thing in a boy's life to wake up each morning with the thought of doing a kindness to someone.

GUIDED INSTEAD OF MISDIRECTED ENERGY

As an antidote for idleness and for that aimless activity which so often goes



The Scout games, as well as the Scout tests and purposes and spirit, are the same among the millions of Scouts in every country. Here we see the boys making a Scout pyramid, which is of practical use in wall scaling and for signaling. "A Scout is a brother to every other Scout" the world over. This great organization of the boy power of the world has become a mighty force for good among the nations.

11. *A Scout is clean.* He keeps clean in body and thought, stands for clean speech, clean sport, clean habits, and travels with a clean crowd.

12. *A Scout is reverent.* He is reverent toward God. He is faithful in his religious duties, and respects the convictions of others in matters of custom and religion.

THE GOOD TURN IS THE TEST

The Scout Motto is: "Be Prepared." The acid test of the Scout is the Daily Good Turn. This is the proof of the Scout. If he does this, he has a right to be classed with the great scouts who have served their country. The good turn may

wrong when misdirected or undirected, the Boy Scout movement is supreme.

If a boy wants to develop a sturdy body, have plenty of fun in the out-of-doors, doing worth-while things; if he wants to camp, to hike, to swim, to boat; if he wants to pal with a fine bunch of boys, to learn a trade or start a hobby; if he wants the kind of training that will help to make him a leader and the kind of citizen his country needs, he should learn more about the Boy Scouts. Scout troops are organized in connection with churches, schools, clubs and all kinds of community centres. The National Headquarters are located in New York City.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 4517.

ON THE SEASHORE AND IN THE WOODS



Here we see a scoutmaster instructing his troop in coast-patrol work. There are 75,000 Scouts living near the coast who are ready whenever the Navy Department may call them. In England the Boy Scouts have been of great assistance in watching the coast-line. The Scouts in America are skilled in signaling, and the patrol organization has been perfected, and can be used by the Government if necessary.



Photo, courtesy Queens Council Boy Scouts of America.

Scouts build their own shelters in the woods. These boys are making a rustic lean-to which they will line with dead leaves held in place by slender saplings to make it weather-proof. Such a shelter, with a warm fire burning in front of it, is a snug resting-place after an afternoon hike on a chilly day.

READY FOR EMERGENCY CALLS



Boy Scout Auxiliary Fire Department, composed chiefly of Eagle Scouts, at Pasadena, California.



Skill in bandaging sometimes saves a life or prevents great suffering. These boys know how.



The boy with the life-ring, like many other Scouts, is ready to help save someone from drowning. The two below can help an animal friend in trouble.

Photos, courtesy Boy Scouts of America.



Atalanta running.



A gladiator.



Paris with the apple.

THE OLD EMPIRES AND NEW EUROPE

A GREAT change came over Greek life and art when Alexander the Great began to be a power in the year 336 before Christ. When we think of the sculpture of the earlier centuries the images that rise in the mind's eye are lofty images—pure and simple statuary of gods and heroes, designed and wrought on a grand scale.

Under Alexander Greece became one of the provinces of a man whose ambition was to be master of the world; and, instead of reflecting an ideal of thought, her art began to reflect the glory of a court and the pomp due to an emperor. Alexander carried Greek culture with him wherever he went, and the change thus brought about, when Greek art was implanted in Asia Minor and traveled as far as India, was of tremendous importance in the history of the world. From this time on Greek art is called Hellenistic.

In the sphere of art and letters Athens gave place to other cities—Alexandria, Pergamum, Ephesus, Rhodes—and in them for many generations the best Greek art of the period was produced. Schools of sculpture arose, a great deal of the work being done to glorify Alexandria, the new city founded by the conqueror and the other towns brought to prominence in his reign. At Ephesus was built at

CONTINUED FROM 4036



this time the famous Temple of Diana, one of the seven wonders of the world. The story runs that Alexander the Great offered to pay the cost of this structure if an inscription in his honor were placed on the building, but the Ephesians declined his offer. Some noble fragments of this temple are to be seen at the British Museum. Alexandrian sculpture was mainly decorative, and never so strong as that of Pergamum.

During his short reign Alexander himself was the moving force behind all art activities, and his influence was felt long after he was dead. A great many portrait busts of the emperor were made and set up in various cities, and his head was struck on the coins. This marks a very significant change, because until his day the coinage had been stamped solely with heads of the gods. Lysippus made the most famous statues of Alexander. As the emperor led, his subjects followed. Portrait sculpture became the fashion, and some good and some merely flattering work was done.

Of the decorative sculpture put in the numerous temples and public buildings set up in Asia Minor very few traces remain. Fragments here and there have been discovered. The most famous is the magnificent Sarcophagus of the Weepers, discovered at Sidon

about 1887, now in the museum at Constantinople. It is built of Attic marble, and is one of the greatest pieces of decorative art which later Greece produced.

The change in the whole outlook of Greek art from about the time of Alexander is shown in several ways. The ancient Greek had divided the world into two classes, Greek and barbarian, and he had looked on all men who had the misfortune not to be Greek with a certain contempt, and ignored them in his art. Now, however, the barbarian, the Ethiopian and the Gaul began to figure in the sculpture of Greece.

Another very interesting change came in the introduction of landscape and ordinary domestic life into reliefs and decoration. Greek sculpture of the great age had been wholly absorbed in heroic figures—the doings of the gods and legendary people. Now, probably because artists were brought into contact with Egyptian art, which had such a pleasant touch for the everyday things, their sculpture became more human. They showed interesting little scenes in their reliefs—peasants in their huts, reapers at work, poets writing, herdsmen with their cattle. Sometimes, strangest of all in this new development, the relief was purely pictorial, showing rocks and trees and streams, evidently carved with intense interest by an artist who knew he was doing something new.

THE TIME WHEN GREEK ART WAS BLENDING WITH THE ART OF ROME

But from the point of view of pure sculpture, the greatest change in the Alexandrian era came in the creating of statues that showed extreme suffering of mind and body. In order to make their thought plain, sculptors exaggerated the horror of pain, twisted bodies about in dreadful contortions, carved faces in expressions of terrible anguish.

The most famous group of this kind comes from the island of Rhodes and belongs to the latest period in the first century B.C., when Greek art was merging into that of Rome. It is called the Laocoön, and is the work of three sculptors—Agesander, Polydorus and Athenodorus. The Laocoön shows a scene in the mythical Trojan War. A Trojan priest called Laocoön had defied the gods, and as he stood on the seashore with his sons there came out of the sea two huge serpents who threw themselves on the youths.

The father seized the serpents to save his sons, but all three were crushed and bitten to death. The group is in the Vatican at Rome, but it has become familiar through innumerable copies in plaster.

The Laocoön is a magnificent rendering of a dramatic moment in a terrible death, but it is bad art. Let us never forget that. The subject is not within the province of sculpture, and to the Greeks of the great years would have been impossible: their taste was perfect.

THE SCENES OF TERROR THAT ARE OUT OF PLACE IN ART

We should always remember, as a guide in taste, that anything in art which preys easily on the emotions, that makes one "creep" and be afraid of dreaming, is bad. It is particularly bad in sculpture because there is something eternal in a solid-marble representation of the human being, and therefore it should be concerned with enduring things. Death itself is beautiful and not dreadful. And intense suffering most mercifully never lasts long; it is a fugitive, if terrible, emotion, and should not be portrayed in art. It may be expressed in verse or a story, for then it is only a matter of a page or a chapter, and the author can take the reader on past it and allow him to see it as part of the whole. For this same reason a critic has said that Leonardo da Vinci's *Mona Lisa* is false art because it immortalizes something as fugitive as a smile.

The famous Farnese Bull, a great marble group made by sculptors of Rhodes and now in the Naples Museum, is another instance of the last and decadent stage of Greek art. It is not so terrible as the Laocoön because it does not show actual suffering.

A much more dignified example of suffering is the scene—Athene slaying a young giant—in the frieze of the huge altar to Zeus at Pergamum. And a better example still is the bronze statue by a sculptor named Epigonus that used to be called the Dying Gladiator, and is now known to be the Dying Gaul. A marble copy of this is in the Capitol, Rome.

To the city of Pergamum about 240 B.C. the fortunes of war brought a strong group of artists. King Attalus, who had just driven off the Gauls, ordered them to make a number of statue groups in honor of his victory. These men settled in Pergamum, and in that city grew up

SCULPTURES FROM THE OLD EMPIRES



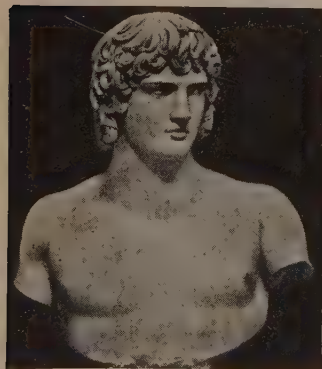
WOMEN LEADING A BULL TO SACRIFICE—AN ANCIENT SCULPTURE IN THE VATICAN



MITHRAS SACRIFICING A BULL—A ROMAN SCULPTURE OF THE SECOND CENTURY A. D.



The Death of Laocoön and His Sons, a group from the island of Rhodes, by Agesander, Polydorus and Athenodorus.



Antinous, the friend of Hadrian.



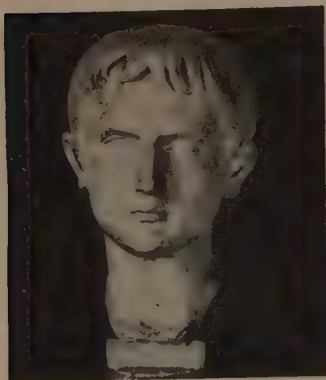
A fine head, perhaps of a German captive.



The Clytie—a Roman portrait of the Augustan Age.



The famous group known as the Farnese Bull, made by Rhodian sculptors and now in the Naples Museum.



Augustus as
a Boy.



The Boy and the Goose,
by Boethus.



A Young Boy's
Head.



The Apollo, in the Belvedere of the Vatican. Copy of a bronze statue.



The Artemis of Versailles, or Diana the Huntress, in the Louvre.



The Wounded Warrior—a statue in the style of the Pergamene school.



The Farnese Hercules, by Glycon, an Athenian sculptor.



Bacchus and a Faun, a group in the Naples Museum.



A Greek Warrior, in the National Museum of Rome.



Part of a column from the Temple of Diana at Ephesus.



Cupid with a Dolphin.



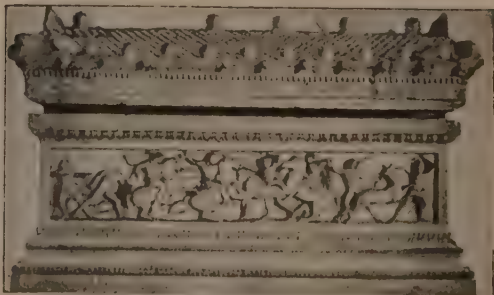
Orpheus and Eurydice, from the Villa Albani in Rome.



A Hunting Scene, from the Sarcophagus of Alexander.



The Sarcophagus of the Weeping Women.



The wonderful Sarcophagus of Alexander.

The pictures on these pages are reproduced by courtesy of Messrs. Alinari, Anderson, Mansell, and others.

the strongest school of Greek art in later times. The statue of the Dying Gaul and another statue showing the death of a Gaul and his wife, now in Rome, are the most famous that have been discovered of the groups made at the order of Attalus.

The most wonderful work of the Pergamene sculptors—and indeed one of the most wonderful examples of all ancient art—belongs to a later reign. It is a colossal altar that was set up to Zeus on the acropolis in Pergamum. The monument, a great mass of white marble with a base about a hundred feet square, was a most awe-inspiring sight. In its magnificence it seemed terrible to the early Christians, who called it the "Throne of Satan."

The colonnaded court in which the actual altar of sacrifice stood was approached by a broad flight of steps, and two sculptured friezes ran round the whole monument. The larger of the two, broken to admit the staircase, decorated the base of the building; the smaller was set on the inside of the colonnade.

THE STORY TOLD IN THE WONDERFUL PERGAMENE FRIEZE

A group of German archæologists dug up about three hundred feet of the greater frieze, and this most imposing piece of sculpture, with figures six feet high, is now in the Berlin Museum. The story of the frieze is a contest between the giants and the gods, picturing in an allegory the struggles between the Gauls and the Asiatic Greeks. The fragment of Athene and the young giant, already mentioned, is typical of the kind of work put into this marvelous frieze. It must have been a magnificent sight—a triumph of composition wherein groups of vivid and heroic figures are flung, as if they had been alive and the marble had petrified them.

In this work at Pergamum we can see the last stage of Greek art. The frieze of the Parthenon is serene and grand, and reminds one of music; the frieze of the Zeus altar is agitated and grand, and reminds one of horses stampeding. Between these two come the delicate grace of Praxiteles and the robust strength of Lysippus and Scopas.

Again we have reason to lament because so little really of Hellenistic art has survived the centuries. Spoliation by enemy peoples, earthquakes and natural ruin are responsible for a tremendous loss.

Still, we are more fortunate than were our forefathers a hundred years ago, for since their time excavations have given us the Elgin marbles and the Pergamene marbles, and many other treasures.

One magnificent thing, also said by the ancients to be one of the seven wonders of the world, is entirely lost to us, and that is the Colossus of Rhodes, a gigantic bronze statue 105 feet high, by Chares, a Rhodian sculptor. It was twelve years in the making, and only sixty years after it was set up it was shattered beyond repair in an earthquake.

A few isolated statues we know by means of marble copies from the work of the later Greeks. One is the Apollo called the Belvedere, from the Belvedere in the Vatican, where it stands. Others are the head of Apollo in the British Museum, the Centaur and Eros, the Artemis of Versailles, and the Borghese Warrior, by Agasias, a sculptor of Ephesus. The last three groups are in the Louvre. Another fine example is the figure of Antioch, in the Vatican, the work of a pupil of Lysippus called Eutychides.

It is very interesting to see in this last period of Greek art the development of the use of the child in sculpture. Until the time of Alexander few child figures of any merit appear. In the third century children began to take their place as subjects for sculpture, and were shown in the proportions of children, instead of being presented as tiny men; from this advancement came the chubby little cupids which later on figured so much in art.

THE FIRST ARTIST TO INTRODUCE CHILDREN INTO SCULPTURE

A sculptor called Boethus, of Carthage, in the third century B.C., seems to have been the first artist to take children seriously as subjects for sculpture, and his work counts as the beginning of a movement. There are several marble copies of his statues in existence. One most delightful example, called The Boy and the Goose, is in the Louvre. It shows a fat little child struggling with a goose about as big as himself. He has seized the bird tightly by the neck, and, if we can guess from the face of the goose, it is complaining bitterly.

This little statue is all the more interesting because it is an illustration of Greek home life, where the goose was a family friend, the playmate of the chil-

dren, and was loved and tormented by them, in the same way that the domestic cat is to-day.

Greek art was not allowed by Fate to die out on its own soil; it was ruthlessly transplanted, and the spoilers were the Romans. When the Roman Empire rose in the West the sculpture of Greece entered on its last phase—called, in art, Græco-Roman. Artists from Athens and Asia Minor migrated to Italy to work for the great conquerors, and, as leading Roman citizens and officials alike had a passion for statues of the gods of Greece, to which they gave Latin names, a veritable forest of statues grew up all through the Empire.

THE CENTURIES OF PLUNDER OF THE NOBLE TREASURES OF GREECE

That was what we might call a reasonable development. It was natural for conquerors to commandeer the best work of the conquered peoples. We find it harder to forgive the wholesale plunder of Greek sculpture that went on for centuries. Generally speaking, the Romans stole statues and carried them away, not so much because they could not bear to leave such beautiful objects behind as because they were proud of their spoil and wanted to parade it just as they did wild beasts from Africa.

The art of Greece—the work of a people whose whole soul was sensitive to beauty—therefore became part of the triumph of Greece's conquerors, who in comparison with the Greeks seemed to have no soul at all, no sensitiveness. People speak of the beauty of Greece, the strength of Rome. We can scarcely understand the extent to which the Hellenistic countries were despoiled. It is said that one general alone carried off from a place in Asia Minor 785 statues in bronze and 230 in marble. It was a common thing for a military official to devote one day of his triumphal procession to the display of "captured" statuary. And the robbery was not only on a huge scale like this: Greece lost much of her best work through the quiet and unnoticed and ceaseless plunder of private persons.

For a long time Athens, Delphi and Olympia, the sacred places of the Greek religion, were left untouched, but the day came when the spoilers entered those last strongholds of art. Nero carried off from Delphi alone 500 bronze statues. Dur-

ing the great fire of Rome a vast number of these lovely things were destroyed.

But not all the Romans collected art works as spoil; some appreciated them for their own sake, and it is said that a number of houses of great Roman citizens were rich beyond thought in beautiful statuary, bronzes, silver, and gilt objects from the East. We have learned something of this since Herculaneum and Pompeii, which were buried by an eruption of Vesuvius in A.D. 79, have been dug out of their lava bed. The homes of ordinary citizens have been laid bare—houses which were treasure stores of art.

Greek art necessarily overshadowed any work of amateur Roman artists, but a native style grew up nevertheless. It was marked, as one would expect, by a strength which sometimes bordered on brutality, and its chief interest for us lies in the portrait sculpture and reliefs. In both these classes of Roman art the object portrayed is of more interest than the work. The reliefs are historical documents of tremendous interest, as they are mainly concerned with the triumphal processions and doings of Roman generals. In some of them the work is realistic and good. The two best-known examples of this relief work are on the Arch of Titus and on Trajan's Column.

Portrait statues were common in every household of note. Two fine specimens are the head of Augustus, in the Vatican, and Julius Cæsar, in the British Museum.

THE AWAKENING OF INTEREST IN GREEK ART IN THE REIGN OF HADRIAN

The influence of Greece came and went during the generations of the development and fulfillment of native Roman art. The best examples of work actually done in Italy by Greek sculptors are the Farnese Hercules by Glycon, the Athenian; the Venus Genetrix by Arcesilaus; and the Orestes and Electra group by Pasiteles.

A revival of Greek interest came when Roman art was failing, in the reign of Hadrian. This emperor tried in his own person to atone for many of the sins of ancient Rome. He was a real lover of art, and spent an enormous energy and wealth in building monuments and setting up statuary in many parts of the empire. He caused some really fine copies of Greek masterpieces to be made, and under his influence art in Italy went through a period of revival.



A Byzantine church—three panels with figures of Christ and the apostles.



The Gothic architecture around the doorway of
St. Peter's Church in Rome.



Figures over the door of the Gothic chapel
of Andrew's Church in Vienna.

Some of the most interesting sculpture of the time is concerned with the beautiful Antinous, Hadrian's devoted friend. This youth, the story says, offered himself as a sacrifice when Hadrian was journeying through Egypt, drowning himself in the Nile in obedience to a mysterious Egyptian law which demanded that a life should be given as hostage for the emperor's safe passage. Hadrian did the best he could in return for such devotion; he caused statues of Antinous to be set up in honor in the chief places of the empire. Hence the number of busts and reliefs immortalizing the beautiful Antinous. They had a faint echo of the Greek manner, but were spoiled by Roman heaviness. The best is a relief in the Villa Albani, Rome.

THE DECLINE OF ROMAN ART AND THE RISE OF BYZANTINE ART

Within two hundred years after Christ Roman art in Italy was spent. In the Eastern Empire a certain amount of work was done, touched more with Persian than with Hellenic influence. In the meantime Christianity was growing, and when Constantine became Christian and pronounced the Roman Empire Christian, another change passed across the world's face. Constantine, we remember, re-divided the empire and moved his capital from Rome to Byzantium, a town which had already passed through many phases and was destined, under its new name of Constantinople, to be the centre of a peculiar history. There, toward the fifth century, sprang up a new art, known as Byzantine.

Two hundred years later a powerful sect of early Christians denounced "images," or sculptured forms of human beings, as wicked, and while their influence held—for a good part of a century—a general destruction of statuary took place. Byzantine art never recovered from this blow, and in all lands swayed by the religion of Jesus Christ sculpture ceased to be practiced.

Presently the ban was raised, and in the fullness of time that which Christianity had destroyed Christianity built up again, but in a new manner. For some four thousand years Eastern art had dominated the world, while much of Europe was in a state of savagery. Now the old forms of art, Egyptian, Persian, Greek and Roman, were all passed away, dead—or, if not dead, incapable of a revival—

and Northern and Western Europe came forward to supply a new art.

From being poor and despised, the "new" religion was now rich, the friend of kings; and as in the early days she had had no covering for her head, she began now to use her freedom and wealth in building churches and cathedrals. Those in Western Europe were called Romanesque, those in Eastern and Northern Europe, Gothic. The Romanesque churches were built largely by monks, who also chiseled what decorative sculpture was designed for the ornamentation of the buildings. It took the form of reliefs of little figures, rather heavy and stiff, in the upper round part of the porches and about the columns.

North of the Alps the Gothic movement was expressing itself in Christian architecture of another kind. The architects of those days were sculptors and designers also, and the workmen they called in to fulfill their orders formed themselves into guilds and became a great power. The marvelous reliefs and figures in the cathedrals of Paris, Chartres, Amiens and Rheims were carved by the first geniuses of the new art.

THE EARLY GOTHIC ART WHICH IS BEAUTIFUL IN ITS SIMPLICITY

We shall be considering presently, from the point of view of architecture, these fairy-like marvels—early Gothic cathedrals and churches. The statuary that adorned them was part of the architecture, part of the design. This period of architectural sculpture had qualities which never came again. The early Gothic statuary was simple and happy. Smiling virgins and happy Christs and saints looked down from the niches of the porches, the galleries, the choir-stalls. An essential difference from Greek art was already noticeable: the nude figure had gone, the draped statuette had come.

To this early and delightful period of Gothic ornament belong also a great mass of carved ivories and little walnut statues of Christ and his mother, and little alabaster reliefs. It was a new art, fresh, obeying no ancient rule save that of purity and suitability to the purpose. When we look at these cathedral porches we are amazed. This early Gothic sculpture is a great and mighty movement in itself—a miracle; the world has seen nothing like it before or since.

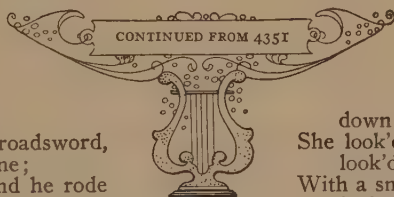
THE NEXT STORY OF THE FINE ARTS IS ON PAGE 4603

A BORDER BALLAD BY SIR WALTER SCOTT

THE ballad is, of all forms of poetry, that best suited to the telling of a dramatic story. Sir Walter Scott, whose poems have the same romantic interest as his novels, wrote a long romance in poetry entitled *Marmion: A Tale of Flodden Field*. In the course of that work several ballads are introduced. *Lochinvar* is one of these. It is supposed to be sung by Lady Heron at Holyrood Palace, where King James is making merry, while Queen Margaret, at Linlithgow Castle, believes he is engaged in battle against the English. The ballad is the kind of spirited love story we all admire, for *Lochinvar*, who snatched his true love away before the very eyes of the man to whom she was on the point of being married, is the ideal hero of romance.

LOCHINVAR

O YOUNG *Lochinvar* is come out of the West,
Through all the wide Border his steed was the best;
And, save his good broadsword, he weapon had none;
He rode all unarm'd, and he rode all alone.
So faithful in love, and so dauntless in war,
There never was knight like the young *Lochinvar*!
He stay'd not for brake and he stopp'd not for stone;
He swam the *Eske* river where ford there was none;
But, ere he alighted at *Netherby* gate,
The bride had consented; the gallant came late;
For a laggard in love, and a dastard in war,
Was to wed the fair *Ellen* of brave *Lochinvar*.
So boldly he enter'd the *Netherby* Hall,
'Mong bridesmen and kinsmen and brothers and all.
Then spake the bride's father, his hand on his sword
(For the poor craven bridegroom said never a word),
"O come ye in peace here, or come ye in war,
Or to dance at our bridal, young Lord *Lochinvar*?"
"I long woo'd your daughter, my suit you denied;—
Love swells like the *Solway*, but ebbs like its tide;—
And now I am come, with this lost love of mine
To lead but one measure, drink one cup of wine.
There are maidens in Scotland more lovely by far,
That would gladly be bride to the young *Lochinvar*!"



The bride kiss'd the goblet; the knight took it up;
He quaff'd off the wine and hethrew down the cup.
She look'd down to blush, and she look'd up to sigh,
With a smile on her lip, and a tear in her eye.
He took her soft hand ere her mother could bar;
"Now tread we a measure!" said young *Lochinvar*.
So stately his form, and so lovely her face,
That never a hall such a galliard did grace;
While her mother did fret and her father did fume,
And the bridegroom stood dangling his bonnet and plume;
And the brides-maidens whispered:—"Twere better by far
To have match'd our fair cousin with young *Lochinvar*."
One touch to her hand, and one word in her ear,
When they reach'd the hall-door, and the charger stood near;
So light to the croup the fair lady he swung.
So light to the saddle before her he sprang!
"She is won! We are gone, over bank, bush and scaur;
They'll have fleet steeds that follow!"
quoth young *Lochinvar*.
There was mounting 'mong *Græmes* of the *Netherby* clan;
Forsters, *Fenwicks*, and *Musgraves*, they rode and they ran;
There was racing and chasing on *Cannobie* Lea,
But the lost bride of *Netherby* ne'er did they see.
So daring in love, and so dauntless in war,
Have ye e'er heard of gallant like young *Lochinvar*?

THE MARSEILLAISE

This poem is the national anthem of the French Republic. But it is something more, for wherever men are striving against oppression and striking for freedom The Marseillaise is adopted as their hymn. It is indeed the anthem of liberty all the world over. It was originally written in French by Captain Rouget de Lisle, a French officer at Strassburg, in 1792, and was called The Hymn of the Army of the Rhine, being written and set to music by the captain for the soldiers of the Rhine army to sing as they marched along. But because it was made known in Paris by the soldiers who came from Marseilles it was called the Marseillaise and has ever since borne that title. These soldiers from the south of France were the most enthusiastic fighters in the great days of the French Revolution, and as they adopted the song, which, with its stirring words and equally stirring music, had soon fired the hearts of the French people, it became the national anthem of the Republic.

YE sons of Freedom, wake to glory!
Hark! hark! what myriads bid you rise—
Your children, wives, and grandsires hoary,
Behold their tears and hear their cries!
Shall hateful tyrants, mischief breeding,
With hireling hosts, a ruffian band,
Affright and desolate the land,
While peace and liberty lie bleeding?

Refrain

To arms, to arms, ye brave!
Th' avenging sword unsheath:
March on! march on! all hearts resolved
On victory or death.

Now, now the dangerous storm is rolling,
Which treacherous kings, confederate, raise;
The dogs of war, let loose, are howling,
And, lo! our fields and cities blaze.
And shall we basely view the ruin,
While lawless force with guilty stride,
Spreads desolation far and wide,
With crimes and blood his hands imbruing?

With luxury and pride surrounded,
The vile, insatiate despots dare
(Their thirst of power and gold unbounded)
To mete and vend the light and air,
Like beasts of burden would they load us,
Like gods would bid their slaves adore:
But man is man, and who is more?
Then shall they longer lash and goad us?

O Liberty, can man resign thee,
Once having felt thy gen'rous flame?
Can dungeon, bolts, and bars confine thee,
Or whips thy noble spirit tame?
Too long the world has wept, bewailing,
That falsehood's dagger tyrants wield;
But freedom is our sword and shield,
And all their arts are unavailing.

O WORLD, BE NOBLER

This appeal to live nobly so as to ease for tender hearts the burdens of the world is by Laurence Binyon, a well-known contemporary English poet.

O WORLD, be nobler, for her sake!
If she but knew thee what thou art,
What wrongs are borne, what deeds are done
In thee, beneath thy daily sun,
Knowest thou not that her tender heart
For pain and very shame would break?
O World, be nobler, for her sake!

THE CROCUS

In northern latitudes, when the garden looks to the eye as if it were still under the power of winter, we are suddenly surprised to see a globe of gold or purple or white light up the soil, and we know then that warmer spring days are at hand. The interesting stranger is the crocus, to which Mrs. Harriet E. King pays so true and fitting a tribute in her poem.

OUT of the frozen earth below,
Out of the melting of the snow,
No flower, but a film, I push to light;
No stem, no bud—yet I have burst
The bars of winter. I am the first,
O Sun, to greet thee out of the night!

Bare are the branches, cold is the air,
Yet it is fire at the heart I bear,
I come, a flame that is fed by none:
The summer hath blossoms for her delight,
Thick and dewy and waxen-white,
Thou seest me golden, O golden Sun.

Deep in the warm sleep underground
Life is still, and the peace profound:
Yet a beam that pierced, and a thrill that
smote,
Call'd me and drew me from far away;—
I rose, I came, to the open day
I have won, unshelter'd, alone, remote.

No bee strays out to greet me at morn,
I shall die ere the butterfly is born,
I shall hear no note of the nightingale;
The swallow will come at the break of green,
He will never know that I have been
Before him here when the world was pale.

They will follow, the rose with the thorny
stem,
The hyacinth stalk—soft airs for them;
They shall have strength, I have but love:
They shall not be tender as I,—
Yet I fought here first, to bloom, to die,
To shine in his face who shines above.

O Glory of Heaven, O Ruler of Morn,
O Dream that shaped me, and I was born
In thy likeness, starry, and flower of flame;
I lie on the earth, and to thee look up,
Into thy image will grow my cup,
Till a sunbeam dissolve it into the same.

UP-HILL

These impressive verses by Christina Rossetti are in praise of high endeavor. Its meaning is mystical.

DOES the road wind up-hill all the way?
Yes, to the very end.
Will the day's journey take the whole long
day?

From morn to night, my friend.

But is there for the night a resting-place?
A roof for when the slow, dark hours begin.
May not the darkness hide it from my face?
You cannot miss that inn.

Shall I meet other wayfarers at night?
Those who have gone before.
Then I must knock, or call when just in sight?
They will not keep you standing at that door.

Shall I find comfort, travel-sore and weak?
Of labour you shall find the sum.
Will there be beds for me and all who seek?
Yes, beds for all who come.

INSCRIPTION ON A SILVER
PLATE*

These lines, written by Eugene Field for his little son, may be read with profit by many who are fathers of families.

WHEN thou dost eat from off this plate
I charge thee be thou temperate;
Unto thine elders at the board
Do thou sweet reverence accord;
And, though to dignity inclined,
Unto the serving-folk be kind;
Be ever mindful to the poor,
Nor turn them hungry from the door;
And unto God, for health and food
And all that in thy life is good,
Give thou thy heart in gratitude.

"SHIPS THAT PASS IN THE NIGHT"

A fragment from Tales of a Wayside Inn, by Henry Wadsworth Longfellow.

SHIPS that pass in the night and speak each
other in passing,
Only a signal shown and a distant voice in the
darkness;
So on the ocean of life, we pass and speak
one another,
Only a look and a voice, then darkness again
and a silence.

THE LESSON OF THE WATER
MILL

In this fine poem Sarah Doudney weaves a lesson around the old proverb, "The mill will never grind again with the water that is passed."

LISTEN to the water mill
Through the livelong day,
How the clicking of the wheel
Wears the hours away!
Languidly the autumn wind
Stirs the forest leaves;
From the field the reapers sing,
Binding up their sheaves.
And a proverb haunts my mind
As a spell is cast—
"The mill cannot grind
With the water that is past."

Autumn winds revive no more
Leaves that once are shed,
And the sickle cannot reap
Corn once gathered.
Flows the ruffled streamlet on,
Tranquil, deep, and still,
Never gliding back again
To the water mill.
Truly speaks that proverb old,
With a meaning vast—
"The mill cannot grind
With the water that is past."

Take the lesson to thyself,
True and loving heart;
Golden youth is fleeting by,
Summer hours depart.
Learn to make the most of life,
Lose no happy day,
Time will never bring thee back
Chances swept away!

* From the poems of Eugene Field, copyright, 1910, by Julia S. Field; published by Charles Scribner's Sons. By permission of the publishers.

Leave no tender word unsaid,
Love while love shall last—
"The mill cannot grind
With the water that is past."

Work while yet the daylight shines,
Man of strength and will!
Never does the streamlet glide
Useless by the mill;
Wait not till to-morrow's sun
Beams upon thy way,
All that thou canst call thine own
Lies in thy "to-day."
Power, and intellect, and health
May not always last—
"The mill cannot grind
With the water that is past."
O the wasted hours of life
That have drifted by!
O the good that might have been,
Lost without a sigh!
Love that we might once have saved
By a single word,
Thoughts conceived, but never penned,
Perishing unheard;
Take the proverb to thine heart,
Take, and hold it fast—
"The mill cannot grind
With the water that is past."

THE CRY OF THE DREAMER†

John Boyle O'Reilly was an Irish author who won distinction in America, where he died in 1890, at the early age of forty-six. He was a true poet, and one who hated the meaner aspects of modern life. In these fine verses this aspect of his character may be seen, for he was one of the dreamers who, by virtue of their serene and beautiful thoughts, can never die.

I AM tired of planning and toiling
In the crowded hives of men;
Heart weary of building and spoiling,
And spoiling and building again.
And I long for the dear old river,
Where I dreamed my youth away;
For a dreamer lives for ever
And a toiler dies in a day.
I am sick of the showy seeming
Of a life that is half a lie;
Of the faces lined with scheming
In the throng that hurries by.
From the sleepless thoughts' endeavour
I would go where the children play;
For a dreamer lives for ever,
And a toiler dies in a day.
I can feel no pride, but pity
For the burdens the rich endure;
There is nothing sweet in the city
But the patient lives of the poor.
Oh! the little hands too skilful,
And the child mind choked with weeds!
The daughter's heart grown wilful,
And the father's heart that bleeds!
No, no! From the street's rude bustle,
From trophies of mart and stage,
I would fly to the wood's low rustle
And the meadow's kindly page.
Let me dream as of old by the river,
And be loved for the dream away;
For a dreamer lives for ever,
And a toiler dies in a day.

† By special permission of the publishers, The Bobbs-Merrill Co.

THE BRAVEST BATTLE THAT EVER WAS FOUGHT*

Joaquin Miller was a picturesque figure in American literature. He was born in Indiana in 1841, and in his earlier life had many adventures, finally settling in California in 1887. He is the singer of the great lands of the West known as the Sierras, and most of his poetry suggests very effectively the freedom and breadth of view of these great spaces of the mighty continent. This poem is in praise of the best of all heroines, the toiling mothers of our race.

THE bravest battle that ever was fought,
Shall I tell you where and when?
On the maps of the world you will find it not;
'Twas fought by the mothers of men.

Nay, not with cannon, or battle-shot,
With sword, or nobler pen;
Nay, not with eloquent word or thought,
From mouths of wonderful men.

But deep in a walled-up woman's heart—
Of woman that would not yield,
But bravely, silently bore her part—
Lo! there is that battle-field!

No marshalling troop, no bivouac song;
No banners to gleam and wave!
But oh! these battles, they last so long—
From babyhood to the grave!

Yet faithful still as a bridge of stars,
She fights in her walled-up town—
Fights on, and on, in the endless wars,
Then silent, unseen goes down!

Oh! ye with banners and battle-shot,
And soldier to shout and praise,
I tell you the kingliest victories fought
Are fought in these silent ways!

Oh! spotless woman in a world of shame,
With splendid and silent scorn,
Go back to God as white as you came,
The kingliest warrior born.

A DEED AND A WORD

Dr. Charles Mackay sings in these verses an old song that is ever new, for the lessons of mercy and kindly consideration for our fellows need ever to be recalled.

A LITTLE stream had lost its way
Amid the grass and fern;

A passing stranger scooped a well,
Where weary men might turn.

He walled it in, and hung with care
A ladle at the brink;

He thought not of the deed he did,
But judged that all might drink.

He passed again, and lo! the well,
By summer never dried,

Had cooled ten thousand parching tongues;
And saved a life beside.

A nameless man amid a crowd

That thronged the daily mart,
Let fall a word of hope and love,

Unstudied, from the heart;
A whisper on the tumult thrown,

A transitory breath—

It raised a brother from the dust,
It saved a soul from death.

O germ! O fount! O word of love!
O thought at random cast!

Ye were but little at the first,
But mighty at the last.

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A MAN'S A MAN FOR A' THAT

Few of the songs of Robert Burns are more popular than this, although so many of its words are unfamiliar to numerous readers. It is a great lyric in praise of the honest poor man who is not ashamed of being poor. He likens the man's rank or place in life to the "stamp" upon the piece of gold which makes it a guinea; but "the man himself is the gold for all that," in good round English. It is his character and deeds which make him worthy or unworthy of the honor of his fellow-men.

IS there, for honest poverty,
That hangs his head, and a' that?
The coward-slave, we pass him by,
We dare be poor for a' that!
For a' that, and a' that,
Our toils obscure, and a' that,
The rank is but the guinea's stamp;
The man's the gowd for a' that.

What tho' on hamely fare we dine,
Wear hodden-gray, and a' that;
Gie fools their silks, and knaves their wine,
A man's a man for a' that.
For a' that, and a' that,
Their tinsel show, and a' that,
The honest man, tho' e'er sae poor,
Is king o' men for a' that.

Ye see yon birkie, ca'd a lord,
Wha struts, and stares, and a' that;
Tho' hundreds worship at his word,
He's but a coof for a' that.
For a' that, and a' that,
His riband, star, and a' that,
The man of independent mind,
He looks and laughs at a' that.

A prince can mak a belted knight,
A marquis, duke, and a' that;
But an honest man's aboon his might,
Guid faith—he mauna fa' that!
For a' that, and a' that,
Their dignities, and a' that,
The pith o' sense, and pride o' worth,
Are higher rank than a' that.

Then let us pray that come it may,
As come it will for a' that,
That sense and worth, o'er a' the earth,
May bear the gree, and a' that.
For a' that, and a' that,
It's coming yet, for a' that,
When man to man, the world o'er,
Shall brothers be for a' that.

FINIS

Finis is a Latin word and means "end." The thoughts uttered in these four lines, therefore, are Walter Savage Landor's summing up of his career. He strikes a note of strength, of intense confidence in himself. His devotion to nature and art, however, excuse much. His pride deceived him, too, for he was almost a born fighter, whether his opponents or the causes for which they stood were worthy of his strife or not. The picture of the old man warming both hands at life's fire and being then ready to go to his long sleep, is ranked among the greatest strokes of imagination in English poetry.

I STROVE with none, for none was worth
my strife.
Nature I loved, and next to Nature, art.
I warmed both hands before the fire of life;
It sinks, and I am ready to depart.

WHAT THE SONNET IS

Perhaps you have already asked the question, What is a Sonnet? The English poet Eugene Lee-Hamilton tells us very beautifully by writing a sonnet to describe a sonnet. It has probably never been equaled. Another poet, in speaking of Shakespeare's sonnets, says they are "Gems fourteen lines long which sparkle on the stretched forefinger of all time."

FOURTEEN small broidered berries on the hem
Of Circe's mantle, each of magic gold;
Fourteen of lone Calypso's tears that rolled
Into the sea, for pearls to come of them;
Fourteen clear signs of omen in the gem
With which Medea human fate foretold;
Fourteen small drops, which Faustus, growing old,
Craved of the Fiend, to water Life's dry stem.
It is the pure white diamond Dante brought
To Beatrice; the sapphire Laura wore
When Petrarch cut it sparkling out of thought;
The ruby Shakespeare hewed from his heart's core;
The dark, deep emerald Rossetti wrought
For his own soul, to wear for evermore.

QUEBEC

This poem by George Frederick Scott gives a stately picture of Canada's oldest and most interesting city.

LIKE some grey warder who with mien sedate
And smile of welcome greets the throngs who pour
Between the portals of a wide-thrown door,
Quebec stands guardian at our water gate,
And watches from her battlemented state
The great ships passing with their living store
Of human myriads coming to our shore
Expectant, joyous, resolute, elate.
Behind her, voiceless to the frozen North,
The mountain wilderness unconquered lies;
Beneath her rolls the river to the sea.
Upon her scroll of fame great names shine forth,
But on her storied crags from morning skies
There dawns the light of greater days to be.

THE ROUND OF THE YEAR

In three short verses Coventry Patmore has given poetical hints of the seasonal changes throughout the year.

THE crocus, while the days are dark,
Unfolds its saffron sheen;
At April's touch the crudest bark
Discovers gems of green.

Then sleep the seasons, full of might;
While slowly swells the pod
And rounds the peach, and in the night
The mushroom bursts the sod.

The winter falls; the frozen rut
Is bound with silver bars;
The snow-drift heaps against the hut,
And night is pierced with stars.

IN THE MAKING

Mr. A. St. John Adcock, a notable critic of modern writings, is himself a poet in spirit and in form. Here he expresses the thought, eternally true, that each of us is forever changing his personality, with death and re-birth as vital processes continually taking place during life.

THE end is never afar
From the hour when our life begins—
In peace we are still at war,
For the victories no one wins;
The young speed on to the fray,
The old go forward in fear,
Yet youth may die in a day,
And age may live for a year.

Shaped and broken and wrought
Anew in the world's rough strife,
I change in heart and in thought,
And grope from life into life;
No longer now we abide
In the world that was ours of yore,
And I have so often died,
I dread not death any more.

The boy that I used to be
Is naught but an old regret—
A something that sleeps, ay, me!
In a grave that others forget:
I have changed as the years have sped,
I shall change as the years go by—
I that was I am dead,
And I that am I must die.

THE DAY OF DAYS *

Sometimes William Morris wrote in a strain that distinctly suggested revolution; but there is more poetry and less threat in this.

EACH eve Earth falleth down the dark,
As though its hope were o'er;
Yet lurks the sun when day is done
Behind tomorrow's door.

Grey grows the dawn while men-folk sleep,
Unseen spreads on the light,
Till the thrush sings to the coloured things,
And Earth forgets her night,

No otherwise wends on our Hope;
E'en as a tale that's told
Are fair lives lost, and all the cost
Of wise and true and bold.

We've toiled and failed; we spake the word;
None hearkened; dumb we lie;
Our Hope is dead, the seed we spread
Fell o'er the Earth to die.

What's this? For joy our hearts stand still,
And life is loved and dear;
The lost and found the Cause hath crowned,
The Day of Days is here.

THE SELKIRK GRACE

SOME hae meat, and canna eat,
And some wad eat that want it;
But we hae meat and we can eat,
And sae the Lord be thankit.

—ROBERT BURNS.

* Published by Longmans, Green & Co. in their Pocket Library.

THE SINGER

This is how John Addington Symonds sees the poet—not necessarily the individual man but the poet who reappears in mankind and, in age after age, reinterprets afresh to the race the truths that purify life and make it beautiful.

HE fills the world with his singing,
High notes of the heavenly morn,
For ever and ever ringing
As age after age is born.

And then he is still, and we know not
Whither his thoughts have fled;
Only the clear notes flow not,
And we say the singer is dead.

But the nightingales that he cherished,
They carol and cannot die;
Though the man whom we loved hath
perished,
His melody throbs for aye.

POET AND KING *

The poets do not often make the claims on the admiration of mankind to which they are entitled. Eugene Field tells us frankly what the poet's true place is in the hearts of men. He is the mightiest king whose sceptre is the pen. "Siege" is an old word meaning "workman's table."

THOUGH I am king I have no throne
Save this rough wooden siege alone;
I have no empire, yet my sway
Extends a myriad leagues away;
No servile vassal bends his knee
In grovelling reverence to me;
Yet at my word all hearts beat high,
And there is fire in every eye,
And love and gratitude they bring
As tribute unto me, a king.

The folk that throng the busy street
Know not it is a king they meet;
And I am glad there is not seen
The monarch in my face and mien.
I should not choose to be the cause
Of fawning or of coarse applause:
I am content to know the arts
Wherewith to lord it o'er their hearts;
For when unto their hearts I sing,
I am a king, I am a king.

My sceptre—see, it is a pen,
Wherewith I rule these hearts of men.
Sometime it pleaseth to beguile
Its monarch fancy with a smile;
Sometime it is athirst for tears;
And so adown the laurelled years
I walk, the noblest lord on earth,
Dispensing sympathy and mirth.
Aha! it is a magic thing
That makes me what I am—a king!

Let empires crumble as they may,
Proudly I hold imperial sway.
The sunshine and the rain of years
Are human smiles and human tears
That come or vanish at my call—
I am the monarch of them all!
Mindful alone of this am I:
The songs I sing shall never die;

Not even envious Death can wring
His glory from so great a king.
Come, brother, be a king with me,
And rule mankind eternally;
Lift up the weak and cheer the strong,
Defend the truth, combat the wrong!
You'll find no sceptre like the pen
To hold and sway the hearts of men;
Its edicts flow in blood and tears
That will outwash the flood of years;
So, brother, sing your songs, oh, sing!
And be with me a king, a king!

THE EARTH AND MAN

This charming comparison of the life-producing power of the earth with the joy-producing power of the human heart is from Stopford Brooke, whose reputation as a preacher and a literary critic of the nineteenth century somewhat obscured his merits as a poet. He lived from 1832 to 1916.

A LITTLE sun, a little rain,
A soft wind blowing from the west,
And woods and fields are sweet again,
And warmth within the mountain's breast.

So simple is the earth we tread,
So quick with love and life her frame,
Ten thousand years have dawned and fled,
And still her magic is the same.

A little love, a little trust,
A soft impulse, a sudden dream,
And life as dry as desert dust
Is fresher than a mountain stream.

So simple is the heart of man,
So ready for new hope and joy;
Ten thousand years since it began
Have left it younger than a boy.

FOR THOSE WHO FAIL †

To the thought in these verses every heart will respond, for the world has had new reasons for honoring men who die before victory. The writer, Joaquin Miller, who was born in Indiana in 1841, published many volumes of verse, mostly on the life of the western states.

ALL honour to him who shall win the prize,
The world has cried for a thousand years,
But to him who tries and who fails and dies
I give great honour and glory and tears.

Give glory and honour and pitiful tears
To all who fail in their deeds sublime;
Their ghosts are many in the van of years,
They were born with Time in advance of
Time.

Oh, great is the hero who wins a name,
But greater many and many a time
Some pale-faced fellow who dies in shame
And lets God finish the thought sublime.

And great is the man with a sword undrawn,
And good is the man who refrains from
wine;
But the man who fails and yet fights on,
Lo, he is the twin-brother of mine.

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SHOCK-HEADED PETER

Half a century or more ago there were not many amusing books for children, and a German physician, Dr. Hoffman, being unable to find the kind of volume he wanted for his little boy, bought a plain notebook, and from time to time wrote short rhymes in the pages and drew little pictures to illustrate them. The rhymes were mostly about disobedient and foolish boys and girls, but they greatly pleased Dr. Hoffman's little son, and delighted even grown-up people, who persuaded the doctor to publish them. These amusing rhymes, beginning with that of Shock-headed Peter, became very popular, and have now been translated into nearly every European language. A selection of Dr. Hoffman's verses is given on these pages.

SHOCK-HEADED PETER

BEHOLD Shock-headed Peter,
This dreadful-looking creature!



He wouldn't let them cut his hair,
Or nails from off his fingers pare,
For nigh the span of one full year.
His friends, whene'er his name they hear,
Cry: "Ugh! You dirty creature!
Horrid Shock-headed Peter!"

THE STORY OF FIDGETY PHILIP

"I OFTEN wonder if our Phil
Will learn at table to sit still?"
His father's voice was very grave,
As he warned him to behave.



His mother looked with silent gaze
Around the table in amaze.
Philip no attention paid
To what his loving father said.
He wriggled and jiggled,
He see-sawed and he-hawed,

Forward and backward he tilted his seat.
"Stop it, Philip, I do entreat!"
See him on his chair just hang,
Soon he'll go down with a bang.
The chair will slip with Philip's weight,
Because the see-saws are too great.



Back goes his chair and down he falls,
It mattered not his frightened squalls.
Nothing can his fall prevent,
But, snatching at the cloth, he sent
Flying every dish and plate.
His father's wrath was very great,
And his mother mutely gazed
Round the table quite amazed.
Phil has gone down with his chair,
The table's left quite clear and bare.
Not a scrap is left to eat;
Soup, potatoes, bread, and meat,
Every glass and dish and bowl,
Wildly on the floor did roll.



Father Jackson and his wife
Never saw in all their life
Such a mess as this before.
They looked with wonder at the floor,
Where, destroyed, lay all their food,
And their tempers were not good.

THE HUNTER AND THE HARE

ONE hot summer day a hunter went out,
For big game and little in green fields
to scout;
With powder-horn, game-bag, and very
long gun,
He walked in his grassy green coat in the
sun.

Placing his spectacles straight on his
nose,
"I'll just shoot a hare," he says as he
goes.
A little hare sat in his house cool and
green,
And laughed as the hunter passed by him
unseen.



The air was so hot, and so dusty the
road,
The gun to the hunter seemed quite a big
load,
So wearily down on the flat of his back
He lay and went off to sleep in a crack.

As soon as he thought the hunter asleep,
The little hare to him softly did creep.
He took the man's gun and his glasses
away,
Then quickly ran off, saying: "No need
to stay."

The glasses he put upon his own nose,
And said: "I see much better now, I
suppose."



He raised the long gun, aimed at the coat
green,
But ere he could fire, by the hunter was
seen.



The hunter jumped up and shouted, dis-
mayed:
"Oh, help me, dear people, I'm dead, I'm
afraid!"
He ran for dear life, no man heard his
yell;
Chased close by the hare, he jumped into
a well.

The little hare fired, and bang went the
gun.
He misses his aim, but what has he done?
The hunter's young wife at the house
window sat,
Enjoying her tea with her favourite cat.



She raised to her lips the tea for to sup,
When whizz came the bullet—in two
broke the cup.
And just at this moment, without fear or
care,
Under the window danced another small
hare.

On him dropped the tea—the picture it
shows,
Drenching his ears, and his eyes, and his
nose.
Affrighted he leaps. "What burns me?"
he said,
And when last was seen whirled the spoon
round his head.

THE STORY OF A BLACKAMOOR

HERE in this picture you can see
A Moor, as black as coal is he.



With his umbrella he one day
Went walking, feeling bright and gay.

Too soon his troubles were begun,
So very hot did shine the sun;
So his uncovered curly head
He shaded with umbrella red.

Then up came Jack, toys in his hand,
To watch the Moor stride on the sand.
Tom brought a hoop, and Will at last
With his new flag came running fast.

They screamed and laughed—yes, all the
three,
When that poor nigger they did see;
Because as black as soot was he.



Just then passed by—who do you
think?—
All laden with a pot of ink,
None other than good Santa Claus;
He saw how bad their purpose was.



He called out in an angry tone:
"Boys, leave the blackamoor alone.
For if he tries with all his might
He cannot change from black to white."

But those three boys were not polite.
They laughed and mocked with all their
might;
And sneered more even than before
About that little blackamoor.

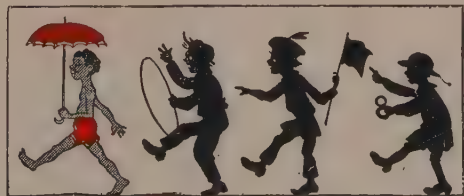


Then Santa Claus did interfere,
He was so cross! You see it here.
He seized them; little did he care
Whether by arms, or legs, or hair.

Right into the ink-pot he put Will,
Bad Jack, and Tom; they kept not still.
When Santa held them very tight,
They kicked and yelled with all their
might.

The good saint dipped them in a wink
Right in that bottle of black ink.
And here the boys—their hearts are
sore—
Are blacker than the blackamoor.

The nigger boy in front you see
Followed by the unlucky three.
If they had kept their sneering back,
They never would have been turned black.



JOHNNY HEAD-IN-AIR

AS he trudged along to school,
It was always Johnny's rule
To be looking at the sky
And the clouds that floated by.
The people cried out every-
where:
"Look at Johnny Head-in-
Air!"



Whene'er a dog came running by,
Still Johnny watched the birds on high.
No one cried: "Now mind your nose,
A little dog's beneath your toes!"
Alack! Alack! there came a jog,
And down fell
Johnny and
the dog.



One day he wandered near a brook,
Holding in one hand a book;
He stared, and stared up to the sky,
To see the clouds and
swallows fly;
And walked quite straight
up to the brook,
Where three small fish
amazed did look.



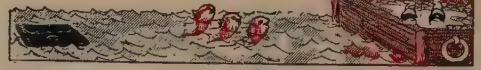
Just one more step, then in a flash
In he tumbled with a splash!
Three small fishes, all afraid,
For their hiding-places made.

Two strong men, each with a hook,
Were standing near that little brook;
They fished him out, all wet, alas!
And laid him on the cool, green grass.



Oh! you should have seen him shiver
When they pulled him from the
river.

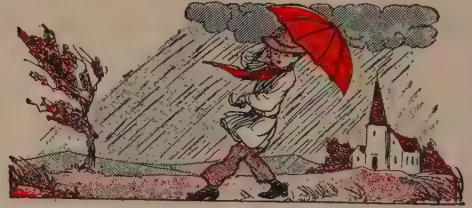
He was in a sorry plight,
Dripping wet, and such a fright!
The chilly water, far from nice,
Makes him feel as cold as ice.



And the little fishes three,
Swim about all full of glee;
They laugh and jeer with all their might
To see poor Johnny's sorry plight.
They laugh and laugh the livelong day
While Johnny's book floats far away.

THE STORY OF FLYING ROBERT

WHEN 'tis pouring hard with rain,
When the storm howls o'er the plain,
Boys and girls are very wise
If they wait for fairer skies.



"I won't wait," daft Robert cried,
"Great must be the fun outside."
With his sunshade he went out,
O'er the fields to roam about.

Now the wind swift onward goes—
Notice how the trees it blows—
Robert's sunshade, flaunting there,
Up is whisked into the air.



Robert, too, goes up withal
Where no ear can catch his call.
Upwards, onwards, he must rush,
Off his hat goes with a gush.

Robert and umbrella fly
Through the clouds up to the sky,
No man in the world can tell
When they stopped or when they fell;
Only this one thing is plain,
Rob was never seen again.



RIP VAN WINKLE

HIS STRANGE ADVENTURE IN THE MOUNTAINS

WHETHER makes a voyage up the Hudson River will see the famous Catskill Mountains, that are a branch of a still greater range stretching away to the west of the river, swelling up to a noble height, and lording it over the surrounding country. Every change of season, every change of weather, indeed, every hour of the day, produces some change in the magical hues and shapes of these mountains, and they are regarded by all the good wives, far and near, as perfect barometers.

When the weather is quite fair and settled they are clothed in blue and purple, and print their bold outlines on the clear evening sky; but sometimes, when the rest of the landscape is cloudless, they gather a hood of gray vapors about their summits, which, in the last rays of the setting sun, glow and light up like a crown of glory.

In a tiny village at the foot of these fairy mountains there lived many years ago a simple, good-natured fellow of the name of Rip Van Winkle. He was a kind neighbor and an obedient husband, and was a general favorite. The children would shout with joy whenever he approached. He

CONTINUED FROM 4305



assisted at their sports, made their little playthings, taught them to fly kites and to shoot marbles, and told them long stories of ghosts, witches and Indians.

Whenever he went roaming about the village he was surrounded by a troop of boys and girls hanging on his skirts, clambering on his back, and playing a thousand tricks on him with impunity, and not a dog would bark at him throughout the neighborhood.

The great failure in Rip's character was his great dislike for all kinds of profitable labor. It could not have been from the want of application or perseverance, for he would sit on a wet rock, with a rod as long and heavy as a Tartar's lance, and fish all day without a murmur, even though he would not be encouraged by a single nibble. He would carry a gun on his shoulder for hours together, trudging through woods and swamps, and up hill and down dale, to shoot a few squirrels or wild pigeons.

He would never refuse to assist a neighbor even in the roughest toil, and was a foremost man at all country frolics for husking Indian corn or building stone fences; the women of the village, too, used to employ him to run

their errands, and to do such little odd jobs as their less obliging husbands would not do for them. In a word, Rip was ready to attend to anybody's business but his own; but as to his doing his duty to his family and keeping his farm in order, he found it impossible.

In fact, he declared it was of no use to work on his farm: it was the most unprofitable little piece of ground in the whole country; everything about it went wrong, and would go wrong, in spite of him. His fences were continually falling to pieces; his cow would either go astray or get among the cabbages; weeds were sure to grow quicker in his fields than anywhere else; the rain always made a point of setting in just as he had some outdoor work to do; so that though his estate had dwindled away, acre by acre, under his management, until there was little more left than a mere patch of Indian corn and potatoes, yet it was the worst-conditioned farm in the neighborhood.

His children, too, were as ragged and wild as if they belonged to nobody. His son Rip promised to inherit the habits with the old clothes of his father. He was generally seen trooping like a colt at his mother's heels, equipped in a pair of his father's cast-off breeches, which he had much difficulty in holding up with one hand, as a fine lady does her train in bad weather.

Rip Van Winkle, however, was one of those happy mortals who take the world easily, eat white bread or brown, whichever can be got with least thought or trouble, and would rather starve on a penny than work for a dollar. If left to himself, he would have whistled life away in perfect contentment; but his wife kept continually shouting in his ears about his idleness, his carelessness, and the ruin he was bringing on his family.

Rip's sole domestic friend was his dog Wolf, who was as much hen-pecked as his master; for Dame Van Winkle regarded them as companions in idleness, and even looked upon Wolf with an evil eye as the cause of his master's going so often astray.

Times grew worse and worse with Rip Van Winkle as the years rolled on. A tart temper never mellows with age, and a sharp tongue is the only edged tool that grows keener with constant use. For a long while he used to console himself,

when driven from home, by frequenting a kind of club of the sages, philosophers and other idle people of the village, which held its sessions on a bench before a small inn that had for its sign a ruddy portrait of his Majesty King George III.

The opinions of this little band were completely controlled by Nicholas Vedder, a patriarch of the village and landlord of the inn, at the door of which he took his seat from morning till night, just moving sufficiently to avoid the sun and keep in the shade of a large tree, so that the neighbors could tell the hour by his movements as accurately as by a sundial. It is true he was rarely heard to speak, but smoked his pipe incessantly. His friends, however, perfectly understood him, and knew how to gather his opinions.

When anything that was read or related displeased him, he was observed to smoke vehemently, and to send forth short, frequent and angry puffs; but when pleased, he would inhale the smoke slowly and tranquilly, and emit it in light and placid clouds; and sometimes, taking the pipe from his mouth and letting the fragrant vapor curl about his nose, would gravely nod his head in token of perfect approbation.

From even this stronghold the unlucky Rip was at length routed by his nagging wife, who would suddenly break in upon the tranquillity of the assemblage and abuse the members for their laziness. Nor was that august personage, Nicholas Vedder himself, sacred from the daring tongue of this terrible woman, who charged him outright with encouraging her husband in his habits of idleness.

Poor Rip was at last reduced almost to despair, and his only alternative to escape from the labor of the farm and clamor of his wife was to take gun in hand and stroll away into the woods. Here he would sometimes seat himself at the foot of a tree and share the contents of his wallet with Wolf, with whom he sympathized as a fellow-sufferer in persecution.

In a long ramble of the kind, on a fine autumnal day, Rip had unconsciously scrambled to one of the highest parts of the Catskill Mountains. He was after his favorite sport of squirrel-shooting, and the still solitudes had echoed and re-echoed with the reports of his gun.



Rip Van Winkle saw a strange figure slowly toiling up the rocks and bending under the weight of something he carried on his back. He was surprised to see any human being in this lonely and unfrequented place.

Panting and fatigued, he threw himself, late in the afternoon, on a green knoll covered with mountain herbage that crowned the brow of a precipice. From an opening between the trees he could overlook all the lower country for many a mile of rich woodland. He saw at a distance the lordly Hudson far, far below him, moving on its silent, majestic course, with the reflection of a purple cloud, or the sail of a lagging bark, here and there sleeping on its glassy bosom, and at last losing itself in the blue highlands.

For some time Rip lay musing on this scene; evening was gradually advancing; the mountains began to throw their long, blue shadows over the valleys; he saw that it would be dark long before he could reach the village, and he heaved a heavy sigh when he thought of encountering the terrors of Dame Van Winkle.

As he was about to descend he heard a voice from a distance hallooing: "Rip Van Winkle! Rip Van Winkle!" He looked round, but could see nothing but a crow winging its solitary flight across the mountain. He thought his fancy must have deceived him, and turned again to descend, when he heard the same cry ring through the still evening air: "Rip

Van Winkle! Rip Van Winkle!" At the same time Wolf bristled up his back, and giving a loud growl, skulked to his master's side, looking fearfully down into the glen.

Rip now felt a vague dread stealing over him; he looked anxiously in the same direction and perceived a strange figure slowly toiling up the rocks and bending under the weight of something he carried on his back. He was surprised to see any human being in this lonely and unfrequented place; but supposing it to be someone of the neighborhood in need of his assistance, he hastened down to help.

On nearer approach he was still more surprised at the singularity of the stranger's appearance. He was a short, squarely built old fellow, with thick, bushy hair and a grizzled beard. His dress was of the antique Dutch fashion—a cloth jerkin strapped round the waist; several pairs of breeches, the outer one of ample volume, decorated with rows of buttons down the sides, and bunches of ribbon at the knees. He bore on his shoulder a stout keg that seemed full of liquor, and made signs for Rip to approach and assist him with the load.

Though rather shy and distrustful of this new acquaintance, Rip complied with his usual alacrity, and mutually assisting each other, they clambered up a narrow gully, apparently the dry bed of a mountain torrent.

As they ascended, Rip every now and then heard long, rolling peals, like distant thunder, that seemed to issue out of a deep ravine, or cleft, between lofty rocks, toward which their rugged path conducted. He paused for an instant, but supposing it to be the muttering of one of those fitful thunder-showers which often take place in mountain heights, he proceeded.

Passing through the ravine, they came to a hollow like a small amphitheatre, surrounded by perpendicular precipices, over the brinks of which tall trees shot their branches, so that they only caught glimpses of the azure sky and the bright evening cloud. During the whole time Rip and his companion had labored on in silence, for though the former marveled greatly what could be the object of carrying a keg of liquor up this wild mountain, yet there was something strange about the unknown that inspired awe and checked familiarity.

On entering the amphitheatre new objects of wonder presented themselves. On a level spot in the centre was a company of odd-looking old men playing at ninepins. They were dressed in a quaint, outlandish fashion—some wore short doublets, others jerkins, with long knives in their belts, and most of them had enormous breeches, of similar style to that of the guide's.

Their visages, too, were peculiar—one had a large head, broad face, and small, piggish eyes; the face of another seemed to consist entirely of nose, and was surmounted by a black sugar-loaf hat, set off with a little red cock's tail. They all had beards of various shapes and colors.

There was one who seemed to be the commander. He was a stout old gentleman with a weatherbeaten countenance; he wore a laced doublet, broad belt and hanger, high-crowned hat and feather, red stockings and high-heeled shoes with roses in them.

The whole group reminded Rip very much of the figures in an old Flemish painting that he had seen in the parlor of Dominie Van Shaick, the village parson, and which had been brought over from Holland at the time of the settlement.



On entering the amphitheatre new objects of wonder presented themselves to Rip Van Winkle. On a level spot in the centre was a company of odd-looking men dressed in an old-fashioned manner playing ninepins.

What seemed particularly odd to Rip was that, though these folks were evidently amusing themselves, yet they maintained the gravest faces, the most mysterious silence, and were, withal, the most melancholy party of pleasure he had ever witnessed. Nothing interrupted the stillness of the scene but the noise of the balls, which, whenever they were rolled, echoed along the mountains like rumbling thunder.

As Rip and his companion approached them they suddenly stopped their play and stared at him with such fixed, statue-like gaze and such strange, uncouth countenances, that his heart turned within him and his knees smote together. His companion now emptied the contents of the keg into large flagons and made signs to him to wait upon the company. He obeyed with fear and trembling; they drank the liquor in profound silence and then they returned to their game.

By degrees Rip's awe and fear subsided. He even ventured, when no eye was fixed upon him, to taste the beverage, which he found very good. He was naturally a thirsty soul, and was soon tempted to repeat the draft. One taste provoked another, and he repeated his visits to the flagon so often that at length his senses were overpowered, his eyes swam in his head, his head gradually declined, and he fell into a deep sleep.

On waking, he found himself on the green knoll whence he had first seen the old man of the glen. He rubbed his eyes—it was a bright, sunny morning. The birds were hopping and twittering among the bushes, and the eagle was wheeling aloft and breasting the pure mountain breeze.

"Surely," thought Rip, "I have not slept here all night." He recalled the occurrences before he fell asleep—the strange man with a keg of liquor, the mountain ravine, the wild retreat among the rocks, the woebegone party at ninepins, the flagon.

"Oh, that wicked flagon!" thought Rip. "What excuse shall I make to Dame Van Winkle?"

He looked round for his gun, but in place of the clean, well-oiled weapon he found an old firelock lying by him, the barrel incrust with rust, the lock falling off, and the stock worm-eaten. He now suspected that the grave men of the mountain had played a trick upon

him, and having dosed him with liquor, had robbed him of his gun. Wolf, too, has disappeared, but he might have strayed away after a squirrel or partridge. He whistled after him and shouted his name, but all in vain; the echoes repeated his whistle and shout, but no dog was to be seen.

He determined to revisit the scene of the last evening's gambol, and if he met with any of the party, to demand his dog and gun. As he rose to walk, he found himself stiff in the joints and wanting in his usual activity. "These mountain beds do not agree with me," thought Rip; "and if this frolic should lay me up with a touch of rheumatism, I shall have a bad time with Dame Van Winkle."

With some difficulty he got down into the glen: he found the gully up which he and his companion had ascended the preceding evening; but, to his astonishment, a mountain stream was now foaming down it, leaping from rock to rock and filling the glen with babbling murmurs. He, however, tried to scramble up its sides, working his toilsome way through thickets of birch and witch-hazel, and sometimes tripped over the wild grape-vines that twisted their tendrils from tree to tree and spread a kind of network in his path.

At length he reached the place where the ravine had opened through the cliffs to the amphitheatre; but no traces of such opening remained. The rocks presented a high, impenetrable wall, over which the torrent came tumbling in a sheet of feathery foam and fell into a broad, deep basin black from the shadows of the surrounding forest.

Here, then, poor Rip was brought to a stand. He again called and whistled after his dog; he was answered only by the cawing of a flock of idle crows sporting high in air about a dry tree that overhung a sunny precipice. What was to be done? The morning was passing away, and Rip felt famished for want of his breakfast. He grieved to give up his dog and his gun, he dreaded to meet his wife; but it would not do to starve among the mountains. He shook his head, and with a heart full of trouble and anxiety shouldered his rusty firelock, and turned his steps toward his distant home.

What happened to him afterward is told in the continuation of this story on page 4559.

THE TALE OF BOB SINGLETON

TOLD AGAIN FROM THE FAMOUS BOOK BY THE AUTHOR OF
ROBINSON CRUSOE

"WHY do you always come to stay at this little village of Islington after each of your voyages, Captain Singleton?" said the innkeeper's pretty daughter Mary. "You have no friends here, that I can see. For those gipsies and beggar women that you are always talking to are not your friends, surely?"

"No, they are not my friends, Mary," said the captain—a fine, tall man, with bronzed face and blue eyes. "They're my enemies, in a way of speaking. Get me another mug of cider, lass, and I will tell you the story of my life, if you care to hear it."

Mary was very eager to hear it. For about fifteen years the captain had always come to the inn at Islington after a voyage, and nobody could make out how it was that the place attracted the lonely, thoughtful sailor. Mary, a sweet and simple girl of eighteen, brought in the cider and sat down on a chair beside the captain, who lighted his pipe and puffed it thoughtfully, and then began his tale:

"Bob Singleton is not my real name. I cannot tell you, Mary, what my real name is, and I do not know where I was born. But I think it must have been 1680 when I came into the world. That would make me now forty years of age."

"Oh, you don't look as old as that!" said Mary.

"There's nothing like seafaring," said Singleton, "to keep a man young-looking and healthy. But to go on with my yarn. My parents must have been rich, whoever they were; for when I was a little boy about two years old I had a nurse-maid to look after me. One summer evening she brought me to these fields of Islington for a walk, and met a young man, who was her sweetheart. They went into an inn—no doubt this very place—and sat down to supper, leaving me playing outside the door.

"As I was running gaily about the fields, tumbling in the grass and plucking flowers, a gipsy woman came by and, snatching me up in her arms, she ran away with me to London. There I was sold for twelve shillings to a beggar woman, who wanted a pretty child to take

about with her to excite the pity of the people she begged from."

"That is why you are always going among the gipsies," said Mary. "You want to find the woman who stole you, and see if she can tell you anything of your parents?"

Captain Singleton nodded.

"She was a good creature in her way, that beggar woman," he continued. "She treated me very kindly and never let me want for anything, and I must have wandered all over England with her.

"I used to think she was my real mother. It was not until she fell ill that she told me how I had been stolen by a gipsy and sold for twelve shillings. Unhappily, she did not know anything about my true parents, and when she died, at Bussleton, a place near Southampton, I was left alone in the world without shelter, food or friend.

"At this time I was a lad about twelve years old, dressed in miserable rags, and, I dare say, very lean and hungry-looking. There are good people in this world, Mary, as well as bad. A master of a ship happened to see me begging in the street, and taking pity on me, he carried me to sea with him to Newfoundland.

"You may be sure that I worked my hardest to please my kind master. I went on four voyages with him, and, what with good treatment and good exercise, I was at the age of fifteen as strong and as sturdy a lad of my years as you could wish to see. But as we were coming home our vessel was captured by a Moorish pirate ship."

"Was there a fight?" said Mary.

"Yes," replied the captain, "and my poor master was badly wounded; but the Moors took care of me, though I could not guess why at the time. I can now see that, as I was then a fine, strapping lad, I should have fetched a high price as a slave. By good luck, however, I did not reach the slave market. The Moors took our ship in tow, and sailed away with it to Algiers. But in the Bay of Cadiz the pirate ship was attacked by two great Portuguese men-of-war, and taken and carried into Lisbon."

"You were fortunate to be rescued from the wicked Moorish pirates," said Mary.

"It was not much of a rescue for me," said Captain Singleton sadly. "My master died of his wounds at Lisbon, and I then found myself there in a worse position than I had been in at Bussleton. Not only was I houseless and starving, but I was in a foreign country, and could not speak a word of their language.

"I had one good friend, however, and that was my old master's ship dog. He used to steal meat and bring it to me, and with this food I managed for some time to keep body and soul together. At last, having acquired a smattering of the Portuguese tongue, I shipped as a sailorman on a great galleon bound for the East Indies."

"But why didn't you try to return to England?" exclaimed Mary.

"I wanted to see the world," said Captain Singleton. "Besides, I had no friends to go to in England, or anywhere else. But I saw more of the world when I left Lisbon than I bargained for. I never got to the East Indies, for the Portuguese crew mutinied and obtained command of the ship, and wrecked it in trying to enter a bay on the coast of Mozambique, where they meant to set up as pirates.

"Mozambique is on the east coast of Africa, opposite Madagascar," continued Captain Singleton, "and it is peopled by savage negroes. Running into the bay was a river about as broad as the Thames at Gravesend. We filled our small boats with plenty of provisions and fire-arms, and sailed and rowed up this river nearly two hundred miles till we came to a great waterfall. Then we landed and divided our powder and shot, which were our means of getting food, and set out on a march of two thousand miles, right across the unknown continent."

"How terrible that must have been!" cried Mary.

"It was very terrible," replied Captain Singleton. "Sometimes the natives gathered in great numbers to oppose us, and it was only because they had never heard a gun go off, and were frightened by the noise, that they let us pass. We nearly perished from thirst in a great desert, and we had to waste a great deal of our precious gunpowder in defending ourselves against savage beasts.

"All our troubles and discomforts, however, were forgotten when we came to a great river which, as we afterward found, ran to a Dutch settlement on the Gold Coast. For the sand on the shore of the river was full of gold. We stayed there three months washing the gold out of the gravel, and when we had each gathered about five hundred pounds' worth of this precious metal, we made a raft and floated in eleven days down to the Dutch settlement, and there I and the Portuguese parted. I went away to Cape Coast Castle, where I got a passage for England, and with my gold, Mary, I bought a fine ship of my own, which I still have."

"You have had an extremely adventurous life," said Mary, with a sweet smile, "and you have, no doubt, made a great deal of money. But why do you always seem so unhappy, Captain Singleton?"

"That is because I am very lonely," said the captain, taking her hand. "Mary, dear, I have given up looking for parents, for I know now that I have found all that I want to make me happy."

"What is that?" said Mary.

Everybody in Islington saw what it was three weeks later, when Captain Singleton and Mary were married in the old village church.

THE FOX WITHOUT A TAIL

IT happened that a fox caught its tail in a trap, and, in struggling to release himself, lost all of it but the stump. At first he was ashamed to show himself among his fellow-foxes. But at last he determined to put a bolder face upon his misfortune, and summoned all the foxes to a general meeting to consider a proposal which he had to place before them. When they had assembled together, the fox proposed that they should all do away with their tails. He pointed out how inconvenient a tail was when they were pursued by their enemies the dogs, how much it was in the way when they desired to sit down and hold a friendly conversation with one another. He failed to see any advantage in carrying about such a useless encumbrance. "That is all very well," said one of the older foxes; "but I do not think you would have recommended us to dispense with our chief ornament if you had not happened to lose it yourself."

ANDROCLES AND THE LION

ANDROCLES was a poor Roman slave who was carried away to northern Africa many hundreds of years ago. His life was very hard and painful, and his master was a very cruel man. At last he resolved that he would try to escape to the seacoast and get back to Rome.

He knew that if he were caught he would be put to death; so he waited till the nights were dark and moonless, and

ing to his feet, he saw against the light the form of a huge tawny lion standing at the entrance to the cave. Androcles had been sleeping in its den. He could not escape: the great lion barred the way. Utterly terror-stricken, he waited for the great beast to spring upon him and kill him.

But the lion did not move. It moaned and licked one of its paws, from which



ANDROCLES DREW THE THORN OUT OF THE LION'S PAW WITH A QUICK MOVEMENT

then he crept out of his master's house and stole through the town, and got into the open country.

On and on he hastened through the darkness as fast as his legs would carry him. But when the day broke he found that instead of making toward the seacoast he had struck into the great lonely desert. He was tired out, hungry and thirsty, and seeing a cave in the side of some cliffs, he crept into it, lay down, and very soon fell into a gentle sleep. Suddenly he was awakened by a terrible roaring, and start-

blood was flowing. Seeing that the animal was in great pain, Androcles forgot his terror and came forward. The lion held up its paw as if it were asking Androcles for help.

Androcles then perceived that a great thorn had got into the paw and cut it and made it swell. He drew the thorn out with a quick movement, and then pressed the swelling and stopped the flow of blood.

Relieved of the pain, the grateful lion limped out of the cave, and in a few minutes returned with a dead rabbit,

which it laid beside Androcles. When the poor slave had cooked and eaten the rabbit, the lion led him to a place in the cliffs where there was a spring of fresh water gushing from the earth.

For three years the man and the lion lived in the cave. They hunted together and slept together, and the great, shaggy, affectionate creature used to lie down at night at Androcles' feet, and slowly wag its huge bushy tail from side to side as a cat does when it lies before the fire and feels happy and comfortable.

But at last Androcles began to weary for the society of his fellow-men. So he left the lion's cave, but he was caught by some soldiers and sent as a fugitive slave to Rome. The ancient Romans were very cruel to runaway slaves and they sentenced Androcles to be killed by wild beasts in the arena on the first public holiday.

A vast multitude of spectators came to see the pitiful sight, and among them was the emperor of Rome, who sat on a high seat above the arena, surrounded by his senators. Androcles was pushed into the great open space, and a lance was

thrust into his hand. With this, he was told, he would have to defend himself against a powerful lion which had been kept for days without food to make it savage and fierce. The poor man was given a chance of surviving; but, as he knew, it was a very, very slight one.

He trembled when the hungry lion sprang out of its cage with a terrible roar, and the lance shook in his feeble grasp as the huge beast came bounding up to him. But instead of rushing fiercely at him and bearing him down, it wagged its tail and began to lick his hands. Then Androcles saw that it was his own lion with whom he had lived in the cave, and he patted it and leaned on its head and cried.

All the spectators marveled at the strange scene, and the emperor sent for Androcles and asked him for an explanation of it. He was so delighted with the wonderful story that he made Androcles a free man and gave him a large sum of money. Thereafter Androcles was free to walk where he would in the streets of Rome, and the faithful lion followed him like a dog wherever he went.

COMMENT GOTHAM ACQUIT UNE MAUVAISE REPUTATION

THE ENGLISH VERSION OF THIS STORY IS GIVEN ON PAGE 2108.

TOUT le monde a entendu parler des sages Fous de Gotham. Mais peut-être ne savons-nous pas qui ils étaient, ni où Gotham se trouve, ni ce que signifie exactement "les sages Fous."

Voici l'histoire: Gotham est un village du comté de Nottingham, et un jour, Sa Majesté le Roi Jean d'Angleterre, allant vers la ville de Nottingham, ordonna que sa suite passât à travers la prairie de Gotham, où on croyait alors que tout terrain par où passait le roi devenait désormais route publique. Les gens de Gotham, qui tenaient à leur prairie, s'arrangèrent pour empêcher le Roi Jean d'y passer. Le roi, rendu furieux par leurs façons, envoya ses officiers pour faire une enquête dans le village.

Quand les officiers arrivèrent, ils trouvèrent quelques-uns des habitants qui criaient et faisaient du bruit au bord d'un étang. Ils tenaient une anguille au bout d'une ficelle et essayaient, disaient-ils, de la noyer dans l'étang! Ils en virent d'autres qui faisaient rouler des fromages le long au bas de la route

—leur donnant de l'élan et les laissant ensuite voyager tout seuls. Ils disaient qu'ils envoyaient leurs fromages au marché de Nottingham. D'autres hissaient en toute hâte, sur une colline, des camions et des charettes. Ils allaient, disaient-ils, mettre un bois à l'ombre des rayons brûlants du soleil. D'autres enfin construisaient une carrière autour d'un buisson où s'était installé un coucou, afin de l'empêcher de s'envoler.

Les officiers partirent à moitié amusés et à moitié dégoûtés; et annoncèrent que Gotham était un village de fous qui ne méritait pas l'attention du roi.

Mais d'autres personnes, qui en savaient plus long sur cette histoire, dirent qu'il y avait des fous très sages à Gotham, et ainsi, la phrase en vint à signifier de la folie simulée dans un but raisonnable. En fait, c'était un compliment et non une critique à l'égard de Gotham. Un vieil auteur anglais dit: "Gotham a des gens aussi sages que ceux qui se rient, sans cause, de leur simplicité."

THE NEXT STORIES ARE ON PAGE 4557.

FRENCH—HURRYING TO THE BOAT

First line, French; second line, English word; third line, as we say it in English.



Le bateau va bientôt partir.
The boat goes soon to start.
 The boat will soon start.

Il y a beaucoup de voyageurs.
There are many of travelers.
 There are many travelers.

Tout le monde se dépêche.
All the world itself hurries.
 Everyone is hurrying.



On crie: "Monsieur Hawes!"
One cries: "Mr. Hawes!"
 Someone calls: "Mr. Hawes!"

C'est un télégramme pour papa.
It is a telegram for Papa.
 It is a telegram for Papa.

Papa l'ouvre; c'est de notre oncle.
Papa it opens; it is from our uncle.
 Papa opens it; it is from our uncle.

Il nous souhaite bon voyage.
He us wishes good journey.
 He wishes us a good journey.



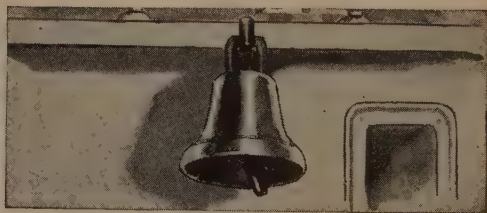
Nous sommes enfin sur le bateau.
We are at last on the boat.
 At last we are on the boat.



Une vieille dame a perdu son perroquet.
An old lady has lost her parrot.
 An old lady has lost her parrot.

La bonne aperçoit la cage.
The nurse sees the cage.
 Nurse sees the cage.

La dame est enchantée.
The lady is delighted.
 The lady is delighted.



Il y a un bruit épouvantable!
There is a noise frightful
 There is a frightful noise!

La cloche sonne. Nous allons partir.
The bell rings. We go to start.
 The bell rings. We are going to start.



Nous nous asseyons sur le pont.
We ourselves sit on the deck.
 We sit on the deck.

THE NEXT FRENCH STORY IS ON PAGE 4592.



Croad Langshan.



Light Sussex.



White Wyandotte.



Dark Brahma.

OUR DOMESTIC POULTRY

IT is believed that the ancestors of our domestic fowls were the so-called jungle fowls of Asia. There are four or five of these—the red and the gray jungle fowls of India, the jungle fowl of Ceylon, the fork-tailed fowl of Java and the East Indies, and the Malay jungle fowls. Some naturalists think that the last-named is really only a variety of the first, and that all our domestic poultry has also come from the same red jungle fowl. Others think that more than one species was tamed, and point to qualities in our poultry not belonging to the red jungle fowl.

How long ago this was we do not know. The Chinese say that they had hens more than three thousand years ago. The Greeks had them, and the Romans, but hens are not mentioned in the Old Testament. They were introduced into Western Europe by the Romans, and were called "Persian birds." This probably means that they came to the Greeks and the Romans from the East by way of Persia. Under this name the early settlers of America brought some of them to this continent. Later when American ships began to visit foreign ports the officers brought back specimens of any fowls which struck their fancy.

By selection and crossing, man has made, and is still making, many changes in the shape, size, color and habits of these fowls. A hundred

CONTINUED FROM 4372



years ago hardly a dozen varieties were known. Now more than a hundred are recognized, and new "breeds" are added every few years. For example, the well-known Barred Plymouth Rock is a breed made by crossing other breeds and selecting the specimens which showed the desired qualities. Now we have not only the Barred, but also White, Buff, and other varieties which breed true in shape, size and color.

By selection and crossing, size can be either increased or diminished. At a poultry show you may see bantams exactly like most of the larger breeds except in size. By the side of one of the larger breeds these tiny fowls, hardly one-fifth as large, seem ridiculous. Later on in this story we tell you the methods by which breeds can be reduced in size.

In a state of nature a jungle fowl lays a batch of eggs—a dozen or less—hatches them, rears her brood, and may consider her duty done for the year. Occasionally she may lay a second batch. The habits of our domestic fowls are quite different. Where man wanted eggs more than chickens, he selected the best layers generation after generation, and had only eggs from good layers hatched. Now we have hens which have been known to lay over three hundred eggs a year and do not attempt to hatch their own eggs at all. All lay many more eggs than their wild ancestors.

Where meat was more important than eggs, he selected those of large size which grew rapidly, and bred from them for generations, until he had fowls almost as much alike as peas in size and color. At first he did this by experimenting, but he has been able to do it with certainty by following the principles laid down by an Austrian monk, Gregor Johann Mendel, whose experiments with sweet peas have given him everlasting fame. He showed how a particular quality in a cross could be fixed or bred out.

Our fowls of to-day may be broadly divided into two classes—useful and fancy. The first contains those breeds and varieties which are valuable for flesh or eggs, or both, and the other those valued chiefly for beauty or oddity.

The useful fowls may be divided into seven great divisions which include many breeds and varieties. These are: Mediterranean, Asiatic, English, French, American, Continental and Indian. All have strong advocates who think that the breed they like is the best.

THE MEDITERRANEAN BREEDS WHICH LAY MANY EGGS

The Mediterranean breeds are the great layers. They are rather small, active, and have almost lost the desire to sit and hatch their eggs. The best-known of these breeds is the Leghorn, of which there are something like eight varieties, distinguished principally by color and combs. They lay many large white eggs and are very active. They are too small to be of much value as market poultry, but when there is more profit in eggs you will be sure to find the Leghorns, White, Buff, Brown or Black. Other Mediterranean breeds are: the Minorcas, Black and White, which are somewhat larger, the Spanish, the Andalusians and the Anconas. All lay well.

Their eggs are large and white and in some markets bring a higher price than the brown eggs laid by the Asiatics and the Americans. In other markets brown eggs bring more. There is no reason for such distinction. The color of the shell has nothing to do with the richness or the flavor of the egg, which do depend somewhat upon the food eaten.

THE ASIATICS AND THE EUROPEAN BREEDS

The Asiatics, as the name indicates, were brought from the East during the nineteenth century by trading ships. All

are large and have feathers on their legs. They do not lay so many eggs as the Mediterranean breeds and are not so active. The recognized breeds are: the Brahmas, Light and Dark; the Cochins, Buff, Partridge, White and Black; and the Langshans, White and Black. Some of these weigh more than a small turkey.

They have good dispositions and are not easily excited. They can be kept in a small yard without building a high fence around it, as they have almost lost the power of flight. The Langshans are rather more active than either the Cochins or the Brahmas. The feathers on the legs of all the Asiatics are a disadvantage in a wet climate.

The English breeds are: the Dorking, Redcap, Sussex, Cornish and Orpington. The Dorking is an excellent table fowl, and the Orpington is a large fowl with smooth legs which has been developed from the Asiatics. The Cornish is an Eastern fowl long bred in England and is often but incorrectly classed as a game. The French fowls have been carefully bred, and some of the best table poultry in the world is produced in France. The best-known breeds are: the Houdan, the Crève-cœur, La Flèche and Faverolle. The Orpington is the only one of these British or French fowls much bred in Canada or the United States.

THE POPULAR AMERICAN BREEDS AND THEIR VARIETIES

Very early in America two distinct breeds became common, though it is not absolutely certain where they originated. They were the Java and the Dominique. These were bred together, and perhaps some other blood was introduced. At any rate, the Barred Plymouth Rock appeared, and, as said above, there are now several other colors. They are what is known as general-purpose fowls. They are between the Mediterranean and the Asiatics in size, in the production of eggs and in activity. Another American breed, of which almost the same sort of things may be said, is the Silver-laced Wyandotte, which also originated by crossing and selection. There are now several colors in the Wyandotte, all attractive.

Years ago there were to be seen on many farms in Rhode Island some attractive chickens of a reddish color. Probably the early sea-captains had brought their ancestors from the Far

SOME POPULAR BREEDS OF FOWLS



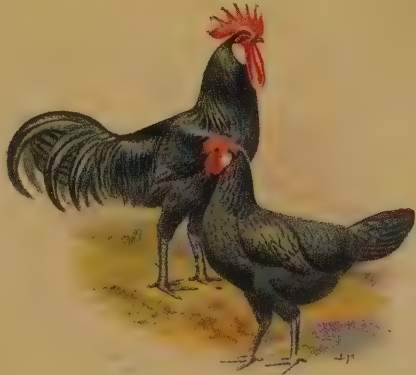
BARRED PLYMOUTH ROCKS



WHITE LEGHORNS



SILVER-LACED WYANDOTTES



BLACK MINORCAS



RHODE ISLAND REDS



LIGHT BRAHMAS

Plymouth Rocks, Wyandottes and Rhode Island Reds are called American breeds. They are general-purpose fowls because they lay well and yet are large enough for market purposes. The smaller Leghorns and Minorcas are Mediterranean breeds and are famous layers. The Brahmias are of immense size. There are several colors of nearly every breed of these fowls.

Pictures by courtesy of Pratt Food Company.

USEFUL AND ORNAMENTAL POULTRY



PARTRIDGE COCHINS



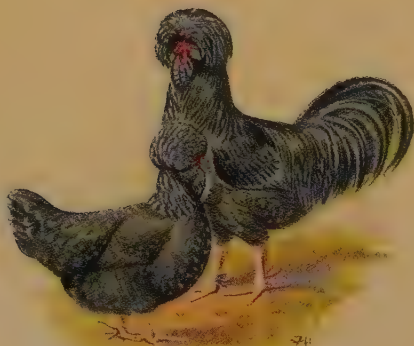
LADY EGLANTINE



BUFF ORPINGTONS



BABY CHICKS



HOUDANS

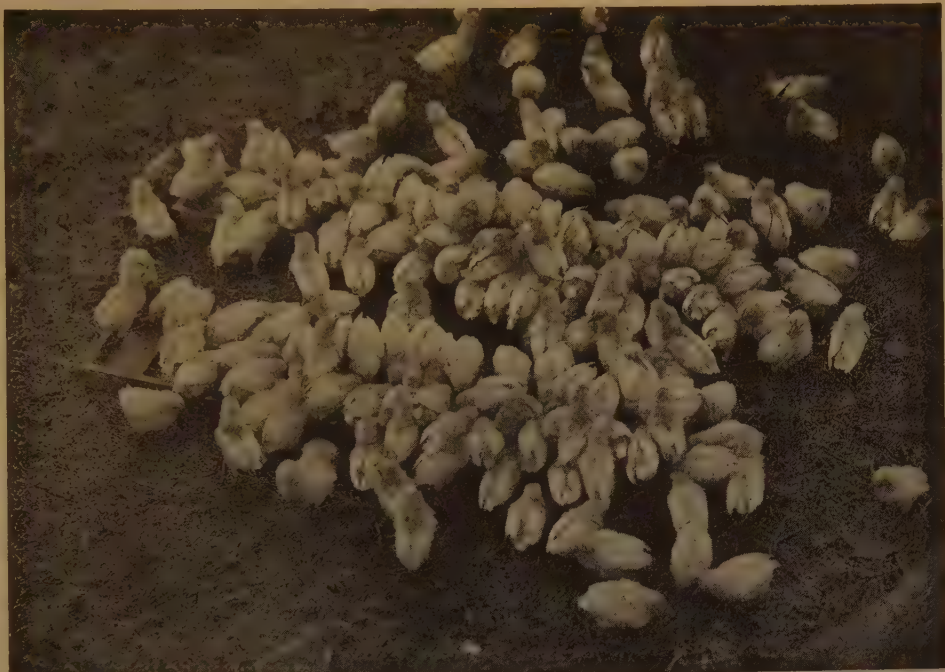


A FARMYARD SCENE

Partridge Cochins are heavy and handsome but do not lay many eggs. Orpingtons are an English breed, and appear in several colors. Houdans are chiefly bred in France. Lady Eglantine is a white Leghorn hen which laid 314 eggs in one year, the world's record at the time. There are over a hundred breeds.

Baby Chicks by courtesy of Kerr Chickery, Lady Eglantine by courtesy of Eglantine Farm; other pictures by courtesy of Pratt Food Company.

SCENES ON A GREAT POULTRY FARM



Here are chickens only a few days old. They were hatched in an incubator, and on a chilly day, or at night, are kept warm in a brooder. This is a wooden or metal box which can be heated by a lamp or a steam pipe. When only a few hours old chickens will pick at food provided for them.



On this poultry farm thousands of White Leghorn fowls are raised every year. These pullets are only a few months old, but will soon begin to lay. The Leghorn is rather small, but lays many large white eggs which bring a good price in the market. There are several other varieties of Leghorn, all of which are good layers. Several breeds have almost lost the desire to hatch their eggs.

Photos, Press Illustrating Service, Inc.

East. They seemed to have good qualities, and breeders began to give some attention to them, and the Rhode Island Red was the result. They are of medium size, good layers and active. Another breed developed from the same stock is the Buckeye. There are other American breeds less well-known. A new breed, the Jersey Black Giants, or Jersey Blacks, is attracting attention. They are very large.

Many of the chickens kept on farms in this country belong to no particular breed. Where any attention is given to breeds the chickens kept are likely to be one of the so-called American breeds, though on some farms Mediterraneans are kept to produce eggs for market. Generally, however, the farmer wishes a fowl which

but this is an error. It has been known in Europe for over a hundred years.

The fancy fowls include many breeds and varieties. There are: the Polish (though it did not come from Poland), with its crested head; the Silkie, on which the feathers resemble hair; the Frizzled, on which each feather curls away from the body. There are eight or more varieties of games. Their breeders claim that they should be classed among the useful fowls, but their savage dispositions are against them. There are many bantams, sprightly and attractive.

Some of these bantams are distinct breeds and are quite unlike most other breeds of fowls. Others are simply dwarf varieties of the larger breeds which have



Photos, Robert F. Hildebrand.
Jersey Black.



Buff Cochon.



White Rock.

grows rapidly, attains a good size and at the same time lays well.

Probably the Barred Plymouth Rock is the most popular fowl in the world. It has not only spread all over North America, but has been taken to South America, Europe and Asia. Some other fowls, and perhaps some of the other varieties of Plymouth Rocks, are handsomer, but the gray-and-black bird has more friends than any other. Even where the chickens in a village or on a farm are a mixed lot, you are likely to see evidence of Barred Plymouth Rock blood.

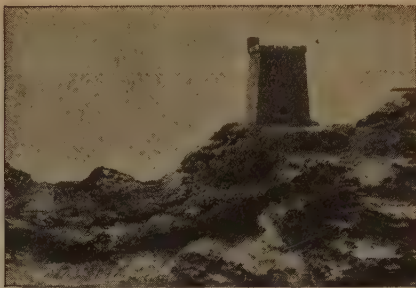
The best-known of the Continental breeds is the Hamburg, of which several varieties were developed in Holland. The Campine is another breed which is attracting attention. It comes from the district of that name in Belgium. It is an excellent layer. The Indian, or Malay, is often classed with the games,

been made by crossing and selection. Many of the larger breeds have tiny counterparts among the bantams.

A man might go about creating such a bantam in this way. He would select the smallest specimen of the breed he could find and set their eggs late in the fall. The young chickens would not have the opportunity to grow much before cold weather, and some of them would not be as large as their parents. By continuing this selection year after year he could reduce the size very much.

He might hasten the progress by crossing with a bantam. Some of the chickens hatched would not be of the right color and shape, and these he would discard, but others would be properly marked. In the course of time, he could get chickens which would breed true in color and shape in spite of the foreign blood.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 4655.



The first picture shows a sand castle roughly shaped, and the second picture the castle finished.

BUILDING SAND CASTLES

ONE of the delights of a holiday spent at the seaside is the building of sand castles

on the beach. But we need not be content with what is usually called a castle—that is, a great pile of sand heaped up with little regard to order. We can, with skill and patience, make a really good model of a castle, like that we see on page 4497.

First of all, we must choose a suitable spot, where there is plenty of clean, damp sand, and pile the sand up into a heap something after the shape of the castle we wish to build.

To begin with we can do something simple, such as a round tower, or perhaps a castle gateway. While piling it up we must beat it well together, so as to make it all as firm and solid as possible; especially must it be well pressed together at the top if we are going to cut out embrasures on the battlements.

If the day is hot, or the sand dry, it will be well to moisten the rough heap, either from a watering-can with a sprinkler or by carefully splashing the water on by hand from a pail or other vessel. The heap must not be wet too much or the walls will collapse. After a little practice we shall be able to judge how wet the sand must be to make it bind well together, but we shall always see signs of too much damp near the foundations first. The heaping-up is best done with the spade, and it is well, in the case of a small castle or specially fine work, to pile it on in handfuls, patting it down carefully so that there are no cracks or flaws. Stones, shells or bits of seaweed must be avoided.

The carving-out is roughly done at first until about the right shape is obtained, and then, beginning from the top, the work is finished off till the bottom of the walls and the ditch claim attention.

A small spade can be used for the rough shaping, but the final trimming needs a smaller tool. A kitchen knife is suitable, and with this the sand is literally cut into shape. When using these tools we must

CONTINUED FROM 4380

always remember to make a slicing cut, especially when carving near corners, or the

edge of the work will be broken away in pieces.

Let us take, as an illustration of the proper methods of sand-working, the building of a tower with battlements. The molding being done, we first trim off the upper part till it is level all around and then mark out the top with a knife to show where the openings will come. Having divided it up equally—that is to say, with the openings at regular intervals—we make slicing cuts with the knife, always inward, to the right depth, and then lift out the cut parts on the knife, thrusting it in from the front. If we do this neatly with a steady hand, those parts of the castle will not need touching again. If, however, any pieces are broken away, they can be replaced without much trouble.

When the openings are cut the battlements must be trimmed to the right thickness, and the centre dug out to form the flat roof. We must do the digging toward the centre so that no pressure is put on the battlements, or they will be easily broken away. For all digging-out operations, making archways or tunnels, an iron spoon is an invaluable tool.

The battlements being complete, the lower work may now be continued. We cut the walls nearly straight down, roughly at first, and then mark out where the cornice of the battlements will come, for an overhanging cornice adds much to the appearance. The line must be straight, and it is well to use a lath of wood as a ruler if it is at hand; we now cut down at the proper angle, and trim off the sand below until the walls are even and vertical.

After trimming, the walls will need to be provided with some windows and perhaps arrow-slits. We mark out the windows with a point before cutting, so that we can see that they are level and in the right places. If we make mistakes in marking out, the marks can be erased by rubbing

with the finger. When ready they will be cut in deep and dug out with a knife if small, or with a spoon if large; care has to be taken lest the edges of the opening are broken. Arrow-slits, if small, can be made with the end of a knife dug in deep and moved from side to side before pulling out.

The arched entrance is made in much the same manner as the windows, only, as it will be tunneled in deep, or perhaps right through the wall, a spoon with a long handle will be useful.

If the back of the wall is to be trimmed down or cut thin, it should be done after the front is finished, and probably will need to be done only roughly; but we must be very careful not to be in too much of a hurry, and trim it off little by little, always letting the pressure of the tool fall on the sand to be removed, and not on the finished work. If all this is done intelligently, it is really quite wonderful what high, thin walls can be made. But do not be too ambitious at first; good stout walls, with one side carefully finished, will be best till practice makes perfect.

If we look at the pictures on the top of page 4497, we can see how the castle appears during the course of construction and when it is finished. The tools can be seen on the right of the first picture—a square of stout

cork linoleum picked up on the beach, with which the sand was lifted on to the rock; the end of a small wooden box, also found on the beach, which served as a spade; a 4-inch steel rule and a pocket-knife.

When building on rock foundations, several difficulties have to be guarded against. When working with wet sand the tendency is for the water to filter down to the bottom, especially as the sand is patted and pummeled a good deal. As it cannot soak away at the base, as is the case when building on a sand foundation, it collects when it reaches the rock, and the mass will divide in two, owing to the sand's running away.

To prevent this difficulty, or to remedy it if it arises, several methods are available. If there is any question as to the sand's being too wet at the start, it will be well to begin with some fairly dry sand at the foundations, using wetter sand near the top. If after the work has proceeded some time there is evidence of the base becoming too wet, take out a few handfuls close to the rock and replace it with drier sand. Another plan is to surround the base with quantities of dry sand to soak up the water, which can be easily cut away as the work proceeds. Perhaps this last method is the best for a young builder of sand castles. At all events it can be tried.

SOME GAMES PLAYED WITH HOOPS

A HOOP RACE

A WINNING-POST is fixed upon, and all the runners stand with their hoops in a row, waiting for the word to start. Then away they go as fast as they can, bowling their hoops, and the first one to reach the winning-post with his hoop wins the game. A very good way to add to the fun is for everyone to change hoops just before starting on the race, and to make it a law that the last hoop to reach the goal wins. Each player will try his best to get in front, hoping that the one who has got his hoop will be left behind.

TURNPIKES

IN this game a course is mapped out on the field, and at certain distances apart short sticks, with an inch or two of space between them, are stuck side by side into the ground. These are "turnpikes," and if no sticks are handy, bricks or stones may be used instead. The players take hoops and bowl them around the course, steering them through the turnpikes, but should they in passing on either side touch one of the pikes, it will count as a mark against them. When the course has been traveled over three times, the number of bad marks against each player is counted, and the one with the fewest marks is the winner. The players must not walk, and should not go slower than a trot.

HOOP PARADE

THIS game might be called "follow my leader with a hoop," and when carefully played makes a pretty pastime for girls or boys. The more that join in it the better the effect. The leader starts off with her hoop at a trot, taking a circular course, and all the others follow behind her. By quickening the

speed she presently comes up behind the last girl in the row, and a large ring is thus formed. Then suddenly she turns her hoop to one side and makes another ring, only in an opposite direction, much as we write the figure 8. This may be kept going for some little time, or varied as the leader's ingenuity can suggest. Of course all who take part in this game should be more or less skillful hoop-bowlers.

HUNT THE STAG

WE want plenty of space for this game and plenty of players. The best runner, who is called the stag, is chosen, and allowed a few moments' start with his hoop. Then away go all the hounds after him, also bowling their hoops, and if the stag knows how to dodge, he may make the others quite breathless before he is caught.

POSTING

THE players stand in a large circle, some yards apart, their separate "stations" being marked by a stick or a stone. No. 1 has all the hoops, and starts the game by running toward her next neighbor, bowling the first hoop as she goes. When halfway she stops, gives the hoop an extra push, and runs back to her station for the next hoop. Meanwhile No. 2 has started on with the first, which she bowls to No. 3, but she must be back in time to receive the second. Thus, one by one, all the hoops are set in motion, each player running backward and forward between her next neighbor and her own station. With care and skill the hoops may be kept going round the circle for some time, but a single mistake means the end of "posting," for where all the hoops are in motion it is not possible to make up any lost time.

BUILDING A SAND CASTLE ON THE BEACH



A bucket and spade, a supply of sand, and willing hands with plenty of patience are all that is necessary for the making of a fine castle. Here we see the builders beginning the walls and towers.



The arch for the gateway is one of the most difficult parts of the building. The sand must be made wet, so that it will "bind," and not fall down upon the garrison, passing in and out.



Patience and skill have at last won a triumph for the bucket and spade; and here we have the ramparts of a castle. Any number of fairy soldiers might keep guard behind those sturdy walls; and the little crosses are each the hiding-place of a bowman ready to let fly his arrow at any enemy who may appear.

Photographs of sand castles and those on page 4495 are by Mr. W. P. Adams.

TRICKS WITH A SET OF DOMINOES

MOST of us possess a box of dominoes, but few, probably, ever thought of using them for conjuring purposes. As a matter of fact, however, a set of dominoes, will enable us to perform two or three capital tricks that will cause much wonder among the audience.

To begin with, we may invite someone to pick out any domino he pleases, and after noticing its spots, hold it hidden in his hand. He is then to multiply the spots at either end of the domino by 2, add 5 to the product, multiply the total so obtained by 5, and add the spots at the opposite end. On his stating the final result, we shall tell him what domino he chose.

In order to ascertain this, all that we have to do is to subtract 25 from the number given, when the remainder will consist of two figures, corresponding with the two ends of the domino.

Thus, suppose the spots were 6 and 3. Twice 6 are 12; 12 and 5 are 17; and 5 times 17 are 85. The addition of the 3 spots at the other end of the domino brings the total up to 88. This is, therefore, the number which is told to the performer. Subtracting 25 from 88, the remainder is 63, the two digits (6 and 3) supplying the desired answer. Which-ever end of the domino we begin with, it comes to the same thing. Suppose we begin with the 3 instead of the 6. Twice 3 are 6; 6 and 5 are 11; 5 times 11 are 55; and 55 and 6 make 61. Twenty-five taken from 61 leaves 36, again giving the spots of the domino, but this time in the reverse order, 3 and 6.

After repeating the trick once or twice, we proceed to a feat of a different kind. We lay fifteen of the dominoes in a row face downward on the table, taking them apparently haphazard, but really choosing particular numbers, as follows: The first domino, at the left-hand end of the row, must be the double 6; the next a 6-5; the third either a 6-4 or a double 5—either of these making a total of 10; the fourth a 6-3 or 5-4—to make 9; the fifth any domino that will show a total of 8; and so on with dominoes making 7, 6, 5, 4, 3, 2 and 1 respectively. The thirteenth domino must be the double blank, after which we complete the row with any two other dominoes we please. The fact that the dominoes are placed in this particular order is of course unknown to the spectators, and we must not let them see us choosing the numbers.

We now invite anyone to shift any number of the dominoes from the right to the left-hand end of the row. While he does so we leave the room, assuring him that though we cannot see what he does, we shall know, notwithstanding, how many dominoes he moves. On our return we say: "Yes, I can tell you how many you have moved. In fact, the dominoes shall tell you yourselves. I will turn up the very domino giving the correct answer." We turn

up one domino, and its points are found exactly to agree with the number that has been shifted.

As a matter of fact, we do not ourselves know the number moved, but we must not let the audience suspect this. The secret lies in the fact that the *third domino from the right-hand end of the row* will always be the same as the number moved. Let us take an example. Say that the dominoes, or stones, as they are called, are at starting as shown in picture 1, save that they will be faces down instead of up. Suppose that three are shifted. The row as thereby altered would then be as in picture 2. We can see that the third from the right is the 2-1, representing 3. If four stones had been moved, the third from the right would have been a 4, and so on. By way of a third trick we may next challenge anyone

to arrange all of the stones in proper domino fashion; 6 against 6, 5 against 5, and

so on. We show in the first place, by doing it, that it can be done. "It looks easy, doesn't it?" we remark. "But now I shall put a spell upon the dominoes, and while the charm lasts nobody but myself can do it." We mix up the dominoes, and now anyone may try, but he will try in vain.

The secret in this case is that in shuffling the dominoes we privately take away any two of them, *all four ends of which are different*, when the rest can no longer be arranged in a continuous row.

To conclude, we again wave our hand over the dominoes, and secretly put back one of those taken away. "Now," we say, "I will take off the charm, and you will find that you can arrange the dominoes quite easily. While you are doing so I will leave the room. When

you have finished, cover the dominoes over with a handkerchief, and I will tell you, without seeing them, the number at each end of the row." Which we do accordingly.

Here, again, the solution is simple enough. A complete set of dominoes, twenty-eight in number, may be arranged domino fashion in a complete circle or chain. If we remove any one stone not being a double, there will be a break in the chain, and the numbers on each side of the break will be the same as those of the stone we removed. For instance, if we have abstracted a 5 and 3, the number at the one end of the row will be a 5, and the number at the other end a 3. Whether the stones are actually arranged in a circle or in a straight line makes no difference. It is necessary to practice the taking-away of the domino so that sharp-eyed watchers do not notice the act. The domino can be slipped up the sleeve or dropped in to the lap. These are a few of the tricks that it is possible to do with dominoes, which may be made extremely interesting, and which will be sure to mystify the onlookers. An advantage is that they are so simple.



1. The row of dominoes arranged ready for the trick to be performed.



2. The row of dominoes as it appears after some have been moved.

HOW TO MAKE CONCRETE STEPS

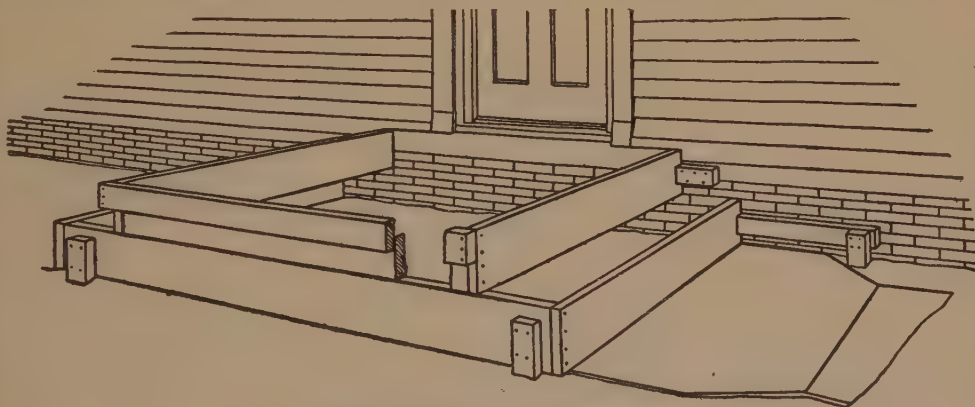
YOU have learned how to make a concrete sidewalk on page 3854. Where it is necessary to pass from one level to another, such as going from the ground level into a basement or cellar or from the ground level up into the first story of a house or other structure, steps are used for convenience.

The accompanying drawing shows a concrete form for simple steps that may be readily adapted to many places as, for example, the side entrance-way of a house. The dimensions should be determined by the width of the doorway and the height needed. As a rule the rise and tread of a step are more or less fixed for ease of ascent. The rise is ordinarily from 6 to 7 inches for each step and the tread is usually from 8 to 10 inches. The materials required for the construction of such simple steps as those illustrated are about the same as those which were needed for the concrete walk construction; 1-inch lumber will be found suitable for the forms.

Before beginning the actual placing of the concrete it is necessary to dig out the area

properly measuring out the required quantity of the materials as determined by computing the volume of the steps to be built, they are mixed as already described under the other concrete project. There should be just enough water added when mixing, so that when the concrete is placed in the forms and firmly tamped to compact it free water will flush to the surface under the tamper. Forms should be filled to within $\frac{1}{2}$ inch of $\frac{3}{4}$ inch of the top of each section for each step. When thus filled, the remainder of the space should be filled with a 1:2 cement-sand mortar mixed to a stiff consistency so that it is somewhat difficult to work under a trowel.

About 24 hours after the last concrete is placed the forms may be removed. Then any imperfections on the surface may be pointed or plastered up with a 1:2 cement-sand mortar. The surface of the concrete should be slightly brushed and wet down immediately before applying this mortar. The work should be kept covered for several days so the concrete will not dry out too rapidly.



Drawing of concrete form for single steps.

where the steps are to be placed, removing all vegetable matter, grass, roots and other similar refuse. If the ground is not quite firm, it should be made compact by first sprinkling with water and then tamping. Next a layer of clean cinders or gravel should be laid. The last-mentioned is for the purpose of providing free drainage beneath the concrete. Thus it prevents water from being retained which otherwise would cause an upheaval due to freezing. The form lumber should be cut and staked into place as is shown in the drawing. All pieces should be nailed lightly together so that the taking-down of the forms will not require sufficient hammering to injure the concrete before it has hardened. The concrete required for such steps should be mixed in the proportions 1:2:4. Be careful to use clean, well-graded materials, as described for concrete-walk construction.

In this case the aggregates, pebbles or broken stone, may range in size up to $1\frac{1}{2}$ inches, since there is considerable mass and the construction permits the use of the coarser material. After

Variations in the finished appearance of such concrete steps may be easily produced by making very slight modifications of these forms. The section or board which forms the riser face can be built out slightly at the top, so that either a square or a rounded edge, as may be desired, can be formed as an extension or a nose to the tread. When this is done it is usually necessary to imbed a layer or wire mesh in the tread while placing the mortar, in order to prevent this nosing from being broken off in use.

The advantages of concrete steps are many. Damp weather and rain do not affect them, and they last indefinitely. They are easy to clean and to keep clean, qualities that will meet with the approval of the housekeeper.

A modification of these concrete steps might be made for a horse block or some other similar construction. Being massive, these steps have some of the elements of concrete foundations. A little planning will suggest several applications of the simple principles which are involved in constructing these concrete steps.

HOW TO MAKE PAPER FLOWERS

PAPER flowers are easily made at very little cost, and if they are well modeled, and the colored paper of which they are made is carefully chosen, it is difficult to distinguish them from the flowers they represent.

Artificial flowers are very useful for table decoration; they can be used with excellent effect as sprays for lampshades, and of course they are always in great demand at bazaars.

ROSES

First consider roses, for which you need only some colored paper and a little wire. Any stationer will supply you with colored crêpe paper at 10 cents a roll, and you can buy a reel of fine wire from a florist's.

You take a strip of colored crêpe paper—red or pink or yellow—about 30 inches long and 3 inches wide. Fold it in half, as from *A* to *B* in picture 1; again fold in half in the same direction; then fold it in three equal parts, and once again into two equal parts. If you count, you will find that the paper is now twenty-four thicknesses.

Take a pencil and mark as shown by dotted line in picture 2, taking care that the folded side, and not the outside edges, is in the position of *C*. Cut round this line with scissors and open out the paper, which will now show twelve petals. Now with one of the blades of the scissors curl the edges of each petal. To do this, hold the paper in the left hand, and with the scissors between the thumb and first finger of the right hand gently pass the blade under the petal, first curling the right side and then the left, but always curling in the same direction. Now gather the first four petals closely together and gradually gather the others round and round these.

Next you must make the calyx of the rose—that is, the little green leaves forming a cup at the base of the flower-head. Take a piece of green crêpe paper, 3 inches by 2 inches, fold it in half and then in the same direction into three equal parts. Cut as shown by dotted line in picture 3. This makes six points when opened out; cut off one, as we require only five; wrap the calyx round the outside rose-leaves and fasten with a small piece of wire. All that remains to be made now is the flower-stalk. Take a strip of green crêpe paper, 7 or 8 inches long and $\frac{1}{2}$ inch wide, and a piece of wire $4\frac{1}{2}$ inches in length. Cover the wire with the green, holding the paper in a slanting direction in the left hand and gradually turning the wire with the right hand until covered. Double up one end of

the stalk for about $\frac{1}{8}$ inch, and fasten the other end of the flower-head, and your flower is quite complete. Leaves for the rose can be bought at the shops quite cheaply.

CHRYSANTHEMUMS

To make a chrysanthemum you must take a piece of yellow tissue-paper 40 inches long and 5 inches wide; fold it in half lengthwise—that is to make a double strip 40 inches long and $2\frac{1}{2}$ inches wide; then with a pair of scissors cut a fringe about $1\frac{1}{4}$ inch deep right along the strip, beginning from the folded side, not the outside edges.

Now hold the paper in the left hand, and with the right hand take the end of the paper and wind round and round as explained above. Prepare the stalk as is shown in making the paper rose, and fasten it very firmly round the base of the flower.

YELLOW MARGUERITES

Marguerites are not quite so easy to make. Take a strip of yellow tissue-paper 10 inches long and 2 inches wide; fold in half, as from *A* to *B* in picture 4; fold again in the same direction, and still again, making the paper eight thicknesses.

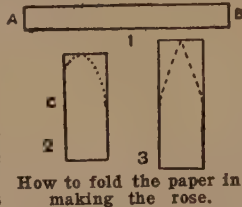
Now take a pencil and draw three petals, as shown in picture 5. Cut with scissors and open out paper, which will now show twenty-four petals.

You have now to make the centres of the marguerites, for which you must get some yellow crewel wool, a few shades deeper in color than the paper; about 3 yards will be sufficient. Wind this round three fingers of the left hand, and fasten a small piece of wire round the centre of the loops, leaving a small end, as shown in picture 6. Bring the ends of the wool together and then cut the edges.

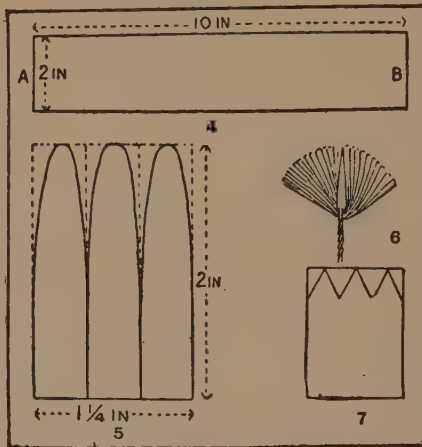
Next take a piece of green paper 3 inches long and 1 inch wide to make the calyx of the flower. Fold this in half; again fold in half, and cut out three peaks, as shown in picture 7.

Now take the long strip of yellow paper, double it, and gather the petals round the wool centre; wrap the green calyx outside this, and fasten with the end of the wire stalk, which should previously have been covered with green crêpe paper, as explained in making the paper rose. Arrange the petals carefully with the fingers, and the flower is finished. All materials should be handled gently, that the flowers may appear crisp and fresh.

This flower needs a little practice to make, but the result will amply repay the worker.



How to fold the paper in making the rose.



How to fold the paper for the marguerite.

DOUBLE YELLOW DAFFODILS

You are now going to make a double daffodil. Cut a strip of yellow tissue-paper, 16 inches long and 2 inches wide, and fold in half, as from A to B in picture 8; fold again three times in the same way, making the strip sixteen thicknesses. Take a pencil and mark the outline of petal as in picture 9. Cut with scissors, open out the paper, and curl the edges of each petal slightly by holding one of the blades of the scissors between the thumb and first finger of the right hand, and gently passing underneath the paper petal.

Now take a strip of paler colored yellow paper 6 inches long and 2½ inches deep and fold into eight pieces—that is, by folding in half 3 times; mark and cut outline of petal as shown in picture 9.

The shape, or outline, of the petal can be altered if wished.

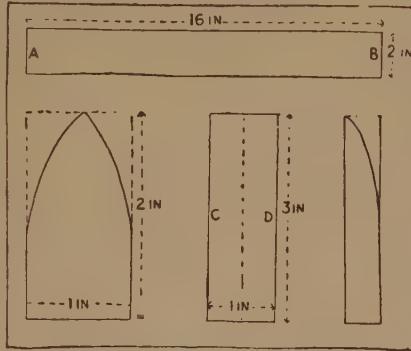
Gather the first four petals of the 16-inch strip together, and arrange the other petals round them; then take the paler colored piece and gather round this, and fasten all securely

together with the end of the green covered wire stalk. Have you ever noticed that in the daffodil there is always a little brown, dried-up-looking leaf growing near the flower-head? You have now to make this little leaf from a small piece of light brown tissue-paper 1 inch across and 3 inches deep. Fold it in half, as from C to D in picture 10, and cut as marked in picture 11, beginning to cut from the outside edges. Open out the leaf and fasten with some green covered wire to the stalk a little way below the flower-head.

All that you now require is just a few green leaves to arrange with your daffodils. These are easily made from a strip of green crêpe paper 7 inches long and 1 inch wide folded and cut in exactly the same way as we cut the brown leaf.

Wire supports may be used to hold the leaves stiff.

If you have followed these instructions intelligently, you will have no difficulty in copying any other flower that pleases your fancy. Observation of the petal shape and care in choosing the right color are both necessary.



How to fold the paper for the daffodil.

A BONNET FOR A BABY DOLL

If you have a baby doll, here is a pretty little bonnet made of a straight piece of material, as shown in picture 1.

It is gathered on one side about ¼ inch from the edge as shown in picture 2, leaving a straight piece on each side. When the thread is drawn quite tight, just as it has been drawn in picture 2, join together the two little straight pieces which you have left on each side of the gathers and you will have the little round shape shown in picture 3, which is the back of our bonnet, before any trimming is added.

On each point of the front a ribbon should be sewn to fasten the bonnet under the chin.

To trim the little bonnet, put a flat piece of lace over the front edge of the bonnet, as shown in picture 1, while a tiny ruche or frilling of Valenciennes lace sewn inside all round will give a soft finish to suit the dimpled face of dolly. Make your stitches very close together so that they will not show.

A round piece of cardboard, about the size of a fifty-cent piece, should be covered with the material and adorned with lace or feather-stitching to cover up the gathered circle at the back.

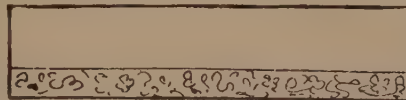
The two little bunches of ribbon which are

fastened to the top of the hat are not quite so easy to make as they at first appear. Like everything else, there is a right way and a wrong way to make a ribbon bow. The right way to make this one is to tie a little loop with strong thread (a long thread being required), bringing another loop by the side of the first one, then a third and a fourth, always twisting the same thread round and round the ribbon without using a needle, until the rosette is quite formed, and is

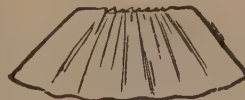
big enough to be put on the bonnet, where it should be secured with a couple of strong stitches. Good milliners boast of the fact that a needle never passes through their ribbons and their bows are as fresh as if they had just come off the bolt and no hand had touched them.

Some milliners first make and trim their hats in muslin, which can be cut, sewn, done and undone until the shape is perfect. That is the way in which you must first try to make this little bonnet. Try it in muslin or crêpe paper, which is soft and elastic, and lends itself as admirably to this sort of work as to flowers. In making

a model out of crêpe paper we do not need to be afraid of spoiling good material.



1. The pattern of the bonnet.



2. The material gathered.



3. The back of the bonnet.



4. The finished bonnet.

NAME-PICTURES AND HOW TO MAKE THEM

MAKING name-pictures, or "smudge-graphs," is a very pretty amusement. We want some paper, pens and ink, and must sit up to the table. Dip the pen in the ink and scribble quickly a fairly thick zigzag line on the paper; then, before it gets dry, fold the paper over at the side of the scribbled line, and rub it down with the thumbnail. On opening it again, a pretty outline will be seen.

Names or words may be written instead, and the paper folded just at the base of the letters. Quite pretty ornamentations can be made like this, even by people who are not able to draw. Fold the paper *first* and use the fold to write against, as you use the lines in exercise-books. Sometimes better effects are made by folding the paper through the middle of the word instead of by the side of it.



PICTURES MADE BY FOLDING OVER SMUDGES, ZIGZAG LINES, CROSSES AND NAMES

A GOOD GAME TO PLAY ON A TRAIN

HERE is an interesting game to play when we are traveling. While the train is standing in the station all the players look about and take as much notice of things as possible. Then, when the train has left the station, and five minutes have elapsed, we take turns naming objects that we saw at

the station. Of course at first this is very easy, and we can go round and round again, each player naming one object which no other player has mentioned. But as the game goes on, it becomes harder and harder to think. The one who is last able to mention an object wins the game.

MAKING A CHEMICAL WEATHER-GLASS

WE may have seen a curious-looking weather-glass in the form of a round tube containing a liquid which becomes clear or cloudy, or flaky or spotted, so that we can tell what sort of weather we are going to have. Some weather-glasses are really very good and are very easy to make. First we require a glass tube 10 inches long and $\frac{3}{4}$ inch in diameter.

We should purchase at any drug store a test tube of this size. We can fasten it to a flat piece of wood if we wish to hang it on the wall, or, if we wish it to stand, we can make a round base with a round hole in the middle, so that the tube can go into it about 1 inch.

The method of making the wood frame or base is not important, and is only for the purpose of steadying the tube. When we have done this, we must have a prescription made up at the druggist's. Here it is:

Camphor, 2 drams.
Potassium nitrate, $\frac{1}{2}$ dram.
Ammonium chloride, $\frac{1}{2}$ dram.
Absolute alcohol, 2 ounces.
Water, 2 ounces.

If the solid ingredients do not dissolve readily, they may be assisted by shaking the bottle, and even by putting the bottle in a little warm water, taking care, however, that

more water is not allowed to get into the bottle. When the mixture is properly dissolved, it should be poured into the weather-glass tube.

Then we put a cork in the top of the tube, to keep out dust. The weather-glass is now ready for its work and may be hung up or placed wherever we wish to have it; but it is best placed exposed to the north and in a shady place, where it cannot get the direct rays of the sun. The appearance of the liquid will change when the weather is going to change. Here are the indications:

Clear liquid—Bright weather.

Crystals at bottom—Thick air, frost in winter.

Dim liquid—Rain.

Dim liquid with small stars—Thunder.

Large flakes—Heavy air, overcast sky, snow in winter.

Threads in upper part—Windy weather.

Small dots—Damp weather, fog.

Rising flakes which remain high—Wind in upper air.

Small stars in winter on bright, clear, sunny days—Snow in a day or two.

It will be well if we write out on a neat card all the indications, so that anyone examining the weather-glass will have the key to the meaning of the different appearances.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 4617.



Noonday Rest, by John Linnell.

WHAT HAPPENS WHEN WE GET TIRED?

TIREDFNESS, or fatigue, is generally due to the poisoning of the brain and the nerves by all sorts of things which are produced in our bodies as the result of work. Sometimes they may be the result of too much exposure to sun and heat. Every day's work, if it is at all hard, produces rather more of these poisonous things than we can get rid of as we go on working. During good sleep they are got rid of, and we wake refreshed.

It is easy to show that this is true. We can take a small quantity of blood from a tired animal, such as a dog, without hurting it, and can inject it into another dog that is not tired. The second dog at once shows all the signs of a dog that has run a long way and is tired out. The poisons produced in the body of the first dog have got into the blood of the second dog, and it also feels tired.

It used to be thought that the cause of fatigue was the need for more food. The tired person, people thought, had used up his food and needed more; just as a railway engine might be said to get tired if the fireman forgot to supply it with plenty of coal.

If this were true, the more utterly exhausted a man was, the bigger the meal that he should take. But we have learned that this old idea was ut-

CONTINUED FROM 4401



terly wrong. The body always contains so large a supply of food material, or fuel, that a man gets tired for some other reason long before he has used it up. Also we have learned that in a state of fatigue it is not possible to digest food properly. Therefore to give a big meal to an exhausted person is very bad for him. He is not fit to use it, and it only upsets him. We should eat only a little, if at all, when we are very tired. The best thing for tiredness is sleep. Young people who are still growing often need ten hours' sleep out of the twenty-four.

We may take water when we are tired, or lemonade, or oranges. These things, in passing through the body, carry all sorts of poisons away and help us to get rid of them. Above all, we must rest and sleep. Generally the people who sleep best are those who work hard. The man who works all day in the fields usually has the best sleep in the world. He is far better off than some unfortunate people who do very little or nothing, and who may even take medicine to help them to sleep. Nature, the best of all doctors, has her own medicine to procure good sleep for every healthy person who works. Natural tiredness produces in our blood the very thing that gives us perfect and natural sleep.

**WHAT IS THE AIR
MADE OF?**

The air is a mixture of several gases, and these are all colorless and transparent. Among the gases in the air are carbon dioxid, which we give off when we breathe—and which is food for plants—and also a small amount of various other gases only found a few years ago. Most air also contains not a little water in the form of a gas or vapor. But all these taken together do not amount to very much. Very nearly the whole of the air is composed of two gases only; about four-fifths are made by a gas called nitrogen, which is very valuable to plants and therefore to us, and the remaining fifth is made by the wonderful gas, oxygen, by which we live every moment of our lives.

But we should not like to tell you what the air of crowded indoor places is made of, or even what the air is made of that you will find in a bedroom in the morning if only a single person has been sleeping in it all night with closed windows. This air is very different from fresh air or open air. It has the same things in it, but it has a great many other things; it has too much carbon dioxid and too little oxygen, and it has all sorts of poisonous gases which the sleeper has given off in his breath and from his skin. But when you asked about air we are sure you meant open air, and we need say no more about foul air except to remember the great difference there is, and that thousands of people are killed every year by not knowing the difference.

**CAN WE FALL OFF
THE EARTH?**

We cannot fall off the earth because the earth holds us to itself by means of its attraction. The earth is so big that its power of attraction is great, and if we wished to escape it altogether we should have to use some other power sufficiently great to succeed in opposing the pull of the earth. Thus, though we cannot fall off the earth, we can imagine that we might be shot off the earth if there were some gun strong enough, but it would have to be thousands of times stronger than the biggest gun ever made. If there were no air, it would be easier to shoot something up into the sky so hard that the earth would not be able to pull it back again. But, as

it is, the air keeps everything back that is thrown or shot up into it. You could not throw a tennis-ball very far in water; and that suggests the kind of way in which the air would push a cannon-ball back if we tried to shoot it away from the earth altogether. Have you read the famous book of Jules Verne which tells how some men were shot in a cannon-ball from the earth to the moon?

**WHAT MAKES THE WHITE MIST
AT NIGHT IN THE HOT WEATHER?**

The mist is water. It is exactly the same as a cloud. If we pass through a cloud it looks like this mist. The hotter the air is, the more water-vapor it can hold. If the air is made very hot by the sun in the daytime, and if there is much water near, with little wind, then the air comes to hold a large quantity of water-vapor. This is a transparent gas, mixed with the other transparent gases that make the air, and so we cannot see it. But as the sun sets, the air quickly gets cooler. It cannot hold as much water-vapor as it did before, and a good deal of the water turns into liquid drops, making a mist. If there is much moisture in the ground this mist naturally forms nearest the ground and looks like a sea of steam.

**WHAT MAKES
AN ECHO?**

An echo is really a very simple thing, and if you know what sound is, you can almost answer this question for yourself.

Sound is a wave in the air, and anything which will stop that wave and send it back again without altering its shape will make an echo. It is really much the same as the waves of the sea striking against a breakwater and coming back again. If the waves get broken up so that, instead of coming back as they went, they come back irregularly, then you will not hear a distinct echo, just as you will not see your face plainly in a mirror unless it is smooth. So the places where you get the best echoes are places where the sound-waves are thrown back exactly as they came, just as the light-waves are thrown back from a mirror. To make an echo, however, we must be standing far enough away from the wall, or whatever it is that throws the waves back, to give the ear time to hear the sound itself, and then to hear the waves as they come back.

WHAT IS CATARACT OF THE EYE?

Cataract, as we read in the story of the eye on page 3683, is a form of blindness caused by the lens of the eye becoming opaque, usually in old age. We know that many great men of the past became blind in their old age, and in some cases it was due to cataract. Nowadays science triumphs over this calamity. Thanks to those who have studied the structure of the eye, and thanks to Pasteur and Lord Lister, who taught us to keep microbes away from wounds, it is now possible to make a little cut in the eye, then a little cut in the coat of the lens, and then, by a little squeeze, to push the lens out through the cut which was made—and there it lies in the surgeon's hand, looking almost like a lens of glass.

This is easily done, without pain. The obstacle to the light is now gone, and light can pour through to the retina; but the rays are not focused, and things cannot be properly seen. The remedy is to supply the person with spectacles, with strong convex lenses that take the place of the lenses he has lost. Few operations, so simple and so easy and so certain, do so much for old people. It would be worth while to study the eye if only to learn how it is possible, by the application of our knowledge, to give sight to the blind in this way.

HOW DOES SALT MELT SNOW?

It is not the salt that melts the snow: it is the mixture of salt and water, called brine, which melts the snow; and the snow melts in the brine just as a lump of sugar melts in a cup of tea—because there is an attraction between its molecules and the molecules of the liquid in which it is placed. One might imagine that the brine made in this way would turn into ice again; but the freezing-point of brine is much lower than the freezing-point of water, and so it remains in a liquid condition even when much colder than 32° Fahrenheit.

WHY DID THE EGYPTIANS USE STRAW FOR THEIR BRICKS?

The clay used by the enslaved Israelites in making bricks for their Egyptian masters, as described in the Book of Genesis, was really mud taken from the banks of the Nile, but this did not hold together well, and so chopped straw was mixed with the mud, to make it firmer by

acting as a binding material. That, however, was not the only reason for using straw. In addition to binding the mud there was a chemical action. The straw, when mixed with the wet clay and allowed to stand for some days, went through a change, and a substance was extracted from it which made the clay more plastic, so that it could be more easily worked.

Bricks are still made in Egypt in the old-fashioned way. The mud from the Nile banks is thrown into a pit with chopped straw and water and trampled underfoot until the whole becomes very plastic. Then it can be shaped into bricks, which are then dried in the sunshine as in the days of old.

WHY ARE WE THROWN FORWARD WHEN THE TRAIN STOPS SUDDENLY?

Newton's first law of motion tells us that every body continues in its state of rest, or of uniform motion in a straight line, except in so far as it is compelled by force to change that state. While a train is moving we are in a state of motion, and when the train stops we must, according to the first law of motion, continue moving unless some force hinders us, and our motion forward makes it seem as if we are thrown forward.

If we are standing in a railway carriage when the train stops, the weight on our feet presses them against the floor and prevents them from continuing their forward motion; but there is nothing except the voluntary force of the muscles to prevent the forward motion of the rest of the body, and so we tend to fall on our faces or on our backs.

WHY HAS A VIOLIN TWO SLITS IN IT?

The music of a violin is to some extent a mystery. We know in a general way that the vibrations of the string under the bow are communicated to the wood of the violin, and that the vibrations of the wood play a very important part in the production of the notes. But the note is modified by many things—by the nature of the wood, by the varnish, by the shape, and so on; one of the most important things affecting the tone of the violin are the two slits, or sound-holes. They have a great deal to do with the special tone. All great makers of violins have had their own special kinds of slits. They are certainly important in the production of notes, though we do not quite understand the way they act.

WHY DOES THE CHAMELEON CHANGE ITS COLOR?

The object of the change of color of the skin of the chameleon is to enable it to become like its surroundings at the time, and so aid it in concealing itself.

This ability the chameleon shares with many other lizards, and they are able to change because they possess within the skin a great number of small cells closely packed together, filled with small granules. This causes a white color by reflecting light. Other cells are full of oil-drops and appear yellow; others contain brown or reddish pigment, and the changes in color are brought about by contraction of different parts of the skin, and the movement of the different pigments.

Thus, when all the pigment is forced toward the surface, the animal looks quite dark. When the pigment is not so near the surface the color is changed to green, and where there is no pigment the skin appears yellow. These changes appear to be under the control of the will of the chameleon, but, in addition, the external surroundings, such as heat or cold, also cause changes in the color.

WHAT MAKES A DIMPLE?

In order to understand a dimple we should know the structure of the skin and what lies underneath it. In most parts of the body the skin, with its outer horny layer and the inner living layer, which carries nerves and blood-vessels and makes the horny layer afresh from day to day, lies very loosely upon the layer of tissue beneath it. This is a loose layer, containing a certain number of fibres running in all directions, with fat-cells lying between them in healthy people—except under the skin of the eyelids, where fat is never found even in the fattest people. A few of these fibres are attached to the under surface of the skin, so that, though we can move the skin about very freely over what lies beneath it, there is a limit to this movement.

But where there are dimples, as on the face, and often round such joints as the knee and the elbow, the number of fibres attached to the under-surface of the skin is much increased, and they are rather short, so that the skin is depressed, or dimpled, at these points. We see what is really the same thing produced accidentally in the case of many scars, which are often a little depressed below the

general level of the skin because they are tacked down in the same way. But a scar differs from a dimple, as the skin over a scar has been lost, and is replaced by a new thing called scar-tissue, while the skin over a dimple is true skin.

IS IT DARKEST JUST BEFORE DAWN?

There is probably very little ground for this belief. At any rate, we may be quite certain that in all cases like this, where we compare darkness and lightness, or loudness and softness, it does not do to trust to the evidence of our senses.

There are various ways by which we can measure the brightness of light. In order to prove that it was darkest just before dawn it would be necessary to use some kind of light-measurer—not our eyes—and compare the amount of light recorded just before dawn with what was recorded before. Our eyes and senses in general do not judge things on their own merits, but always by comparison with other things.

The proper way to say this is that all our sensations are relative. A room may be light relatively to a room that is less light. If we go to the room from darkness we call it bright; if we go to the room from blazing sunlight we call it dark. And so we judge the darkness before dawn by the dawn. When daylight begins to come, we think how dark it was before.

WHY IS SALT DAMP WHEN IT IS GOING TO RAIN?

When we say that the salt is damp, we mean that it has taken a lot of water into itself, and of course it has absorbed the water from the air. Common salt, like a host of other things, will help itself to the water in the air, though many other salts will do so far more readily than common salt does. We are speaking, of course, of water that was in the form of gas in the air.

Plainly, the reason why salt becomes damp before it rains is that there is an unusual amount of water-vapor in the air. Indeed, the rain is due to the fact that the water in the air has become too great for the air to hold longer, and so down it tumbles in the form of rain. When rain-drops form, we know that the water of the air condenses in little drops around particles of dust, and so on, in the air. Similarly the water in the air condenses upon the particles of salt.

THE NEXT WONDER QUESTIONS ARE ON PAGE 4593.



© Ewing Galloway. Snow-bent aspens straightening in springtime.

AMERICAN TREES IN SUMMER

OUR continent is so vast that the plant life in one corner in no way resembles that of another. Speaking in general terms, each corner, or desert, or mountain range, or river-bottom, or sea-beach has its own variety of soil and climate and a plant population that has fitted itself for ages to withstand the trials of life in that particular locality, be it large or small.

These great divisions of plant life are called "floras," and so distinct are they, except where they mingle on the border-lands, that skilled botanists say that if they were taken blindfolded on a magic carpet to any part of North America, by looking around at the plants they could soon tell pretty nearly their whereabouts. If they should be dropped in a grove of the trees which we have pictured, for instance, they would be sure that they were in the eastern half of the continent, and they might guess that they were somewhere between the Great Lakes and the Atlantic Ocean.

Let us imagine that the botanist's carpet has descended in the scraggy branches of a sweet-gum tree; he would know that he was east of the Mississippi and probably south of the St. Lawrence, for the sweet-gum does not

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go much farther in that direction. On the other hand, if he found the lovely little striped maple, he would know that he must be north of Georgia, for this tree rarely travels farther south. The odorous bayberry would warn him that he was near the coast; and tree after tree would add its evidence to help him to locate himself.

In this way we have come to think of certain trees, or groups of trees, as always to be found in certain parts of America. When we speak of the southeastern coast, we promptly remember the tufted palmetto; while the persimmon and magnolia and the moss-draped live oak are always present in our dreams of the Mississippi bayous; and of course we never forget the white pines of Canada.

But Canadians always remember the maples, for these trees grow so abundantly in Canada that a maple leaf has been chosen as the emblem of the dominion. There are many varieties of maple. One of them that we frequently read about in hunters' tales is usually termed Moosewood, because, it is thought, the moose love to eat its great, tender buds that are close-wrapped in crimson scales. It is also called the Striped Maple. Although it

is rarely seen growing alone, it is readily recognized in the copses by its smooth green bark, striped with white, and by its great soft three-lobed leaves. It is almost a shrub when compared with the great Red Maple and the Sugar Maples. The former is one of the first trees to turn its coat and warn us of the coming of winter, showing vivid patches of red here and there very early in autumn. The sugar maple, on the contrary, is inclined to become golden or pale scarlet, and often its foliage is mottled with both colors. While the red maple adorns itself with tufted deep red blossoms before the leaves unfold, the sugar maple drops its tassels of honey-colored flowers beneath the newly opened foliage.

THE SUGAR MAPLE AND MAPLE-SUGAR

A well-grown field Sugar Maple is a magnificent tree, shaped something like a pyramid, with solid-looking dark foliage. Its leaves are very simply lobed with squarish divisions. Its pale-tinted wood is hard and very heavy, and, as we all know, is made into hardwood floors, furniture and the like. It is especially valuable when the tree grows so that the wood has the appearance that we call "bird's-eye maple." "Curled" maple, which we get from both the Red Maple and the Sugar Maple, is valuable also. But altogether the most interesting thing about the sugar maple is the syrup and sugar! It is a small Quebec or New England farm that has not a sugar-bush; and it is one of the pleasant duties of the farmer to go out in the snowy springtide, and by boring holes in the bark of the sugar maple and fixing little spouts therein, to draw off the sap that is rising upward just under the rough bark.

The sap in this stage is colorless, thin and faintly sweet to the taste. By careful boiling the water in the sap is evaporated, and in time the liquid becomes a syrup and finally turns to sugar. The sap-boiling is a time of gaiety for young folks, who frolic in the snow and about the huge bonfires under the sap-kettles and eat maple-sugar in every form they can invent.

The early settlers learned this art from the Indians in western Massachusetts, who made the sugar and sold it, dark brown and coarse and filled with bits of twigs and leaves, but nevertheless delicious, in little birch-bark boxes. Some-

times they took out the water from the sap by freezing it night after night, each morning throwing away the cake of ice that had formed and that contained most of the water, leaving the sugary thick fluid. They even ate scrapings of the sappy, sweetish bark, as the southern negroes chew sugar-cane. Some Indians have a curious habit of putting maple-sugar on their meat or in soup, instead of salt, which they do not like, as well as eating it as we do, on hominy or boiled wild rice.

THE HONEY-LOCUST—A HANDSOME TREE WITH FEATHERY FOLIAGE

Another sweetmeat for the Indian children was the pod of the Honey-locust. This is a handsome tree that has traveled far from its original home in the Middle West, and has spread widely its flattened top in many a park and highway. The leaves are composed of many small leaflets, among which the clusters of long flat black and twisted pods are easily seen, especially as they stick to the branches during the winter. They are filled with a sweetish watery pulp in which the hard seeds lie, and this is pleasant to the tongue. The honey-locust is distantly related to the acacias and mimosas about which travelers in African deserts tell us. We remember that they also speak of the vicious thorns that endeavor to protect the feathery foliage, but which the giraffe ignores when he reaches over the mimosa tops with his long neck.

Our locust, like them, is well armed with enormous spines, which are polished and branched, every spur being quite capable of stabbing to good effect. They appear in the most unlikely places on branches and trunk, often in groups. Unlike the common locust, the flowers are inconspicuous, but its trembling foliage, which scarcely casts a shadow, gives the tree a charming delicacy of outline. We may notice that the pale little leaflets rise up as the sun sets and press their upper surfaces together. This is called their "sleep," and prevents the escape of heat from the delicate leaves at night, and also reduces the chance of injury from excessive coolness, heavy rains, and so forth.

THE MAGNIFICENT COLUMN OF THE TULIP TREE

Some of our trees have leaves of so unusual a shape that if we once see them, we

INTERESTING SHRUBS AND TREES



ASH

The Ash is a handsome tree, which usually grows in moist soil. Its elastic tough wood is valuable. The European ash has many myths told about it.



PIN OAK

The Pin Oak is a common eastern oak, readily known by its deeply cut, rather small leaves, and its drooping lower limbs. It is planted in parks and along streets.

shall never forget them. Such are those borne by the beautiful Tulip Tree, which one might describe as square in general outline, with a notch taken out of each side and another at the tip. We learn from fossil specimens found in rocks that they have changed but little in shape since prehistoric days. Each leaf comes out of the bud folded upon itself, and within an oval case of translucent tissue formed by the two stipules. The stipules open as the swelling leaf comes out, and remain at the base of each leaf-stalk for some time. The leaves of the tulip tree tremble like those of the poplar, and the tree is often called "white" or "yellow" poplar. It bears handsome flowers on the tips of its upturned branchlets. They much resemble tulips in shape and are brilliant yellow, with a splashing of orange and pale green at the base of the cup; the sap-green tone of the foliage about each flower harmonizes most charmingly.

The Tulip Tree is one of the most magnificent trees of our forests. In the prime of life, if it has had sufficient moisture and room, it forms an almost perfect cone from the ground to its topmost spray. It is famous, moreover, for the height and unbroken straightness of its trunk, that rises like a column, no matter how shapeless and broken the head may become. This was observed by the Indians, who took advantage of the softness and lightness of the boles by digging great canoes out of them. Carpenters usually refer to the lumber of the tulip tree as "white wood," and it is a favorite material for finishing the interiors of houses, especially when the woodwork is to be stained and painted, for it is easily worked smooth and soft. Panels of carriages are also made from it.

Even after the leaves drift away, the tree retains its interest, for it is then seen to be laden with countless cones of fruit. When ripe, we discover that the cones are formed by row after row of upstanding winged seeds; and on dry, sunny days we shall find these seeds flaring in circles about the base of the little interior cone they have been overlapping. A stick thrown among them, or even a high wind, will send yellow clouds of the seeds to earth furiously twirling as they descend to scatter far and near, perhaps, and start a new growth of handsome little trees.

THE INDIANS MADE THEIR CANOE PADDLES FROM THE ASH TREE

Other winged paddle-shaped seeds come spinning to their last resting-place from the Ash. They are called "keys," and are gathered into great bunches on the branches, which sweep outward in an interesting double curve and bear leaves having several large leaflets.

There is little of the romance that is gathered about the European ash included in our folklore, but it is justly valued for the strength and toughness, and the elasticity of its wood, which the Indians used for paddles. This was quite convenient since the tree frequently overhangs watercourses. Even nowadays oars are made of ash, as well as tool-handles, wagon-shafts and other parts of vehicles, besides many other things.

THE LIQUIDAMBAR, OR SWEET-GUM

Some of us may have seen "alligator-wood" sold on city streets, and wondered what it really is. The irregular twigs, gray and crested with wavy ridges of a material like ash-colored cork, seem foreign and unlikely to grow in America; yet one can break them from trees within the limits of New York City—trees bearing the sonorous Latin name "Liquidambar," and the less romantic English title "Sweet-gum." Both names refer to its resinous sap, which may be used in place of storax, an incense gum which we get from a relative of the Sweet-gum that grows in Asia Minor.

The Liquidambar grows in Connecticut and southward to the Gulf of Mexico. In youth it appears to take a very slender, spire-like shape, but becomes less shapely as it ages. The leaves are cut deeply into several sharp-pointed lobes, and look like great green stars. In winter the ground beneath a sweet-gum is strewn with curiously spiked or horned balls that prove to be its fruit. A mass of two-beaked hard capsules growing together like a sphere, is each fruit, and there is need of the number of them that we see swinging from the leafless twigs, for there are few fertile seeds in each sphere. It is a great forest tree. The wood takes a soft satiny polish, and is sometimes called satin walnut.

THE PICTURESQUE OUTLINE OF THE PIN OAK

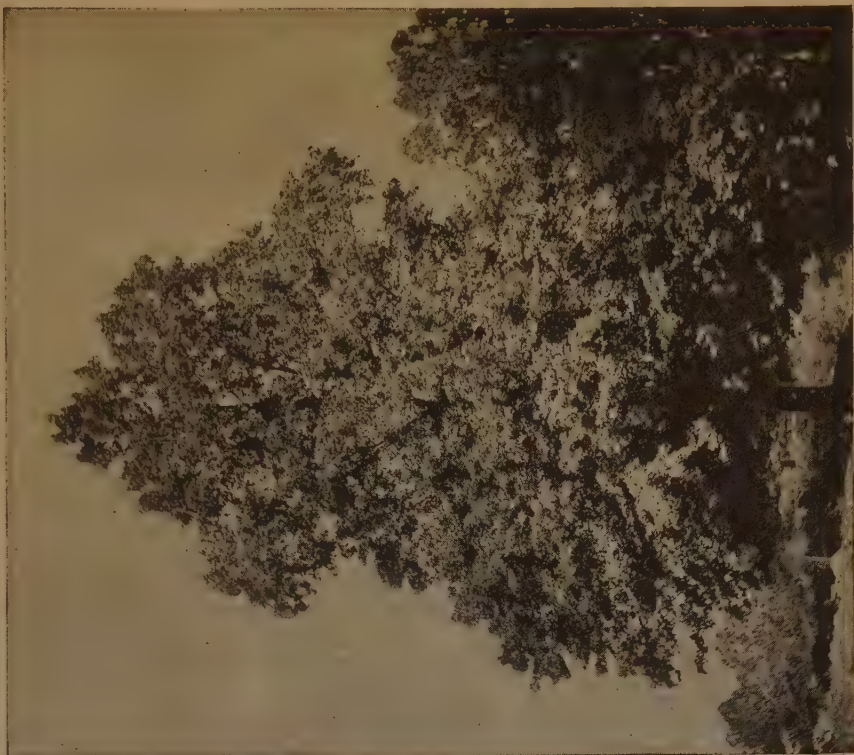
One could write a whole book on the oaks alone of North America. We have

TWO HANDSOME FOREST TREES OF GREAT VALUE



CHESTNUT

The Chestnut is a fine forest tree which was formerly of great value, not only for its wood, which is strong and easily split, but for its sweet nuts. Unhappily the chestnut groves are being destroyed by a fungous growth that works under the bark.



SUGAR MAPLE

The Sugar Maple often grows on rocky hillsides as well as in the woods. A well-grown, shapely maple tree standing alone in a field is a fine sight. Its dark foliage gives a grateful shade in summer. The hard wood is useful for many purposes.

already spoken of the White and Live oaks. In this story we shall speak of the Pin Oak, one of the most easily recognized and picturesque of our eastern oaks, and one that is frequently planted in highways and parks, because it grows quickly.

In the forest it generally chooses moist, or even wet, soil; and when youthful it is a pyramidal little tree with thickly set branches standing out horizontally all around the stem, and a maze of little branchlets and spiky interwoven twigs.



THE BUTTERNUT

The Butternut, or White Walnut, is nearly related to the Black Walnut, and gives one of the largest and richest of our nuts. The outer hull furnished the colonial yellowish brown dye called "butternut."

But when older, the lower limbs droop until they rest dying and broken against the trunk, while the middle and upper limbs rise in an almost unbroken series of sweeping lines, which gradually change from the droop of the hanging lower limbs to the uprightness of the vertical leader at the top. The small acorns falling from their shallow cups are sometimes striped; the pretty foliage is deeply cut, often nearly to the midribs. The wood is strong, hard and light brown in color.

THE BUTTERNUT—A NUT-BEARING FOREST TREE

A ripe butternut must present a problem to the eager teeth of even a red

squirrel; for, when it falls, it is enveloped in a sticky husk, and when this disappears, it leaves a four-ribbed oblong nut two inches long, with a stony-hard shell, bearing thin, saw-edged ridges. All summer, at first soft and green, the butternuts have been ripening in clusters at the top of the branches, tucked in at the bases of the great leaves broken up into many leaflets that are not a whit too big for the fine tree that bears them. In early days a dye called butternut brown was made from this tree—some say from the husks of the nuts (which certainly stain the fingers), while others claim that the inner bark gave the tint which the colonists used to color their homespun cloth.

Blooming under the Wild Red Cherry are the straggling bushes of the Chokecherry, from which hang long clusters of luscious-looking scarlet berries, which will pucker the mouth and throat most amazingly. And near them will spring the Butternut, which shoots up into one of the handsomest of forest trees. It is not often that one can reach the furred twigs, with their sticky half-opened leaves composed of many pairs of long pointed leaflets, and an odd bud at the tip; whence, in early spring, hang tassels of the stamen-bearing flowers, like green catkins. Other flowers hold the pistils, ready to catch pollen; and long afterward these flowers develop into nuts with sweet rich kernels.

We have been told that the Indians smashed the kernels and stirred them in water, making a buttery liquid, from which the name arose. The tree is also called the White Walnut, from its likeness to its cousin the famous Black Walnut, but its wood is soft and light and much paler in color than that of the black walnut, although it looks like it when stained properly, and is frequently used for finishing rooms, making furniture and other cabinet work.

THE WHITE BLOSSOMED SHADBUSH, OR SERVICE-BERRY

The little June-berry adorns itself with slender-petaled white blooms before its cottony leaves have fairly left the bud and while the shad are swimming up the river—whence its homely name of Shadbush.

Service-, or more commonly "Sarvice-" berry, it is also called. It frequently grows into a small, slender tree, and, if the birds would only leave it alone, would ripen its sweetish fruits, very like plump

TREES THAT ARE BEAUTIFUL IN SPRING AND AUTUMN



TULIP TREE

The Tulip Tree is one of the handsomest of our flowering trees. The trunk is tall, straight and column-like. It has squarish deeply notched leaves of peculiar shape, and the striking yellow flowers shaped like tulips are beautiful in the spring.



LIQUIDAMBAR

The Liquidambar, or Sweet Gum, is so called because of its resinous sap. It is easily known by its curious fruit—like spiked spheres—and by its handsome star-shaped leaves. It is beautiful in autumn when the leaves are red and purple.

THE BUTTERNUT TREE AND THE HONEY-LOCUST



BUTTERNUT TREE

The Butternut is a very close relative of the black walnut and is sometimes called white walnut. In foliage and habit it somewhat resembles the former tree, but is smaller and not so valuable. Its nuts are as good to eat as hickory nuts.



HONEY-LOCUST

The Honey-locust is often confused with the common locust, or false acacia. Its coarse-grained wood is sometimes used for fence posts. It has long black pods filled with pulp. The Indian children liked to eat the pods.

rosehaws in appearance. But the mealy pulp appears to be so delicious to all birds that one scarcely ever finds ripened fruit beneath the cherry-like foliage. It is said that Indians picked the fruits, but I cannot imagine where they found enough to make it worth while. The birds make it practically useless to improve the Service-berry.

It is not from the attack of birds, but from those of little gnawing animals that great nut trees seek to protect the sweet rich kernels of their fruit; and they are not altogether successful, we think, when we notice the number of shells bitten open and emptied by squirrels and chipmunks in a walk through the forest.

THE NOBLE CHESTNUT TREE AND ITS USES TO MAN

It is fitting that our little talk about the Chestnut should come at the end of the story, for unless some clever scientist discovers a remedy for the disease that is killing them, our chestnut groves will soon be destroyed just as the apple orchards are vanishing under the curse of the San José scale. The latter can be controlled by spraying, but the fungous disease of the chestnut, which girdles and soon kills even great trees, works under the bark, and therefore spraying does no good. It will not be long before the noble trees, with their gray deeply furrowed bark and long-pointed sharply toothed leaves, will be only memories, as well as the sweet glossy nuts, hurled by Jack Frost out of the velvet-lined husks in which they have lain all summer protected against bird and beast by the fearful bristling armor of prickles on the outside of those spherical husks. What will the railroads do without their chestnut ties under the rails, riven out of the tough brown durable and easily split wood, or the carpenters, who have used it in finishing houses, or the farmers who have made fence-posts and a thousand and one things out of the chestnut poles? And how we shall miss its great round domes, which lighten the color of the forest in June with their masses of pale yellow tassels of bloom, that will turn no more into the red-brown nuts with the sweet kernels.

We are quite used to eating the sweet chestnuts, but we scarcely think of adding bark to our table dainties. School-children, however, delight in nibbling the smooth thin spicy bark of black birch twigs; and they do not realize that in

sub-Arctic Russia the poor peasants depend upon the birch bark to use as a sort of salad in their meals.

The earliest settlers in New England found that certain Indians called "tree-eaters" by wealthier folk ate the tender bark of various trees when they had devoured their scanty winter stores of food. Moreover, in the western states, where the great poplars line the watercourses, the Indians scrape off their sweet and sappy inner bark for a delicacy. "It is their ice cream," said an educated red man. Farther west, the sugar pines and



Blossom and leaf of the Tulip Tree.

other pines are similarly stripped by little scrapers carried for the purpose.

One of the oddest forms of bark-food, that much resembled oakum, or the fibrous coat of a coconut, was offered to explorers on the Pacific coast, who found that they were eating dried hemlock bark soaked in salmon oil, which was, unfortunately, usually rancid.

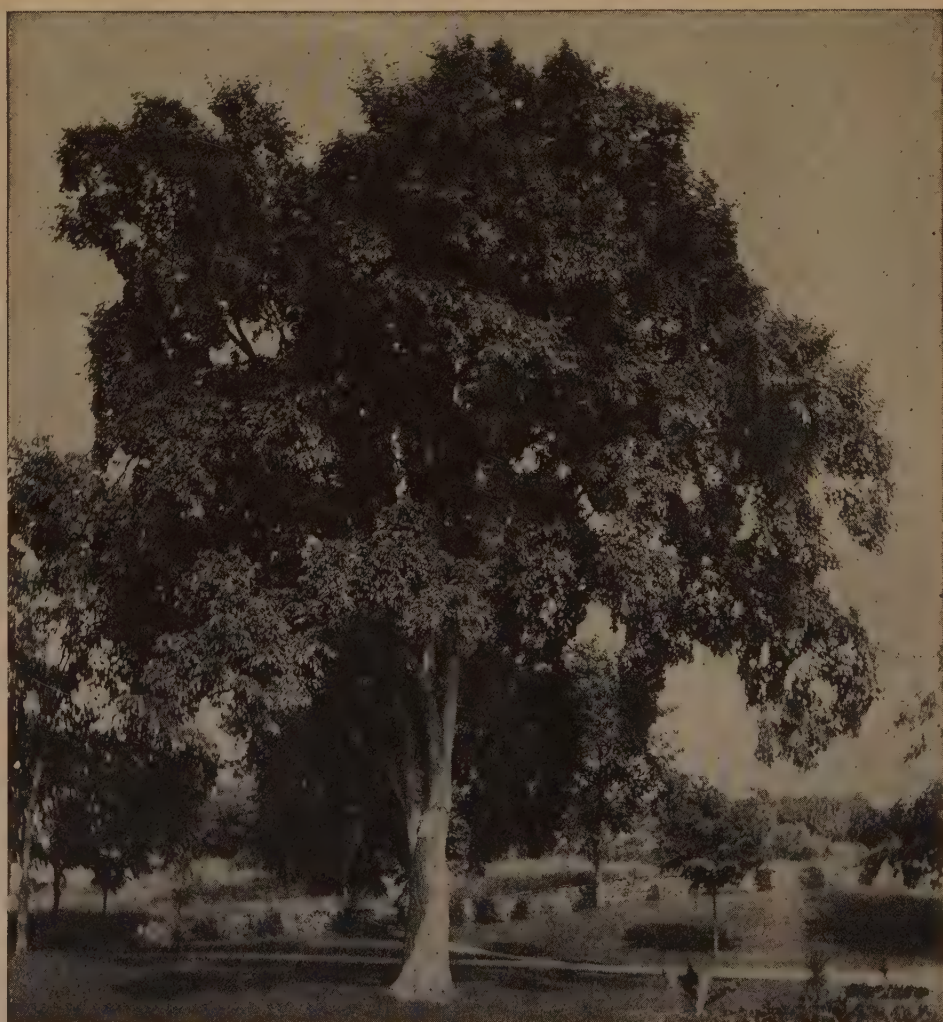
Besides its occasional use as food, bark is valuable in other ways. That of the hemlock, the oak, the chestnut and the birch is used in tanning leather. And from the thin tough birch bark many articles are fashioned by the Indians.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 4635.

THE AMERICAN ELM AND ITS SEEDS



The light, flat seed of the American Elm.



The American Elm is a magnificent shade tree with graceful, sweeping branches which give it an unusual appearance of lightness. This tree lives to a great age, and there are many noted specimens, especially in Canada and New England. Compare this elm with the more compact English elm.

